

The

Refrigeration Service Engineer

VOL. 10 NO. 4

★ ★ ★

APRIL · 1942



elding Soda Fountain Bodies

Engineering & Industrial Conference
CHICAGO — MAY 10-11

2 NEW ROTARY'S

for

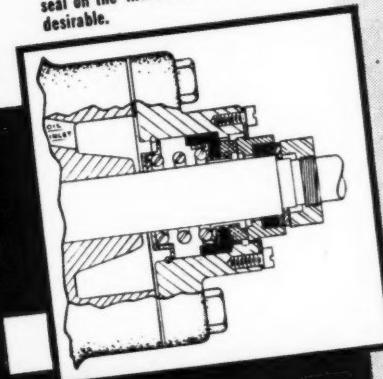
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DUST and SOLDER

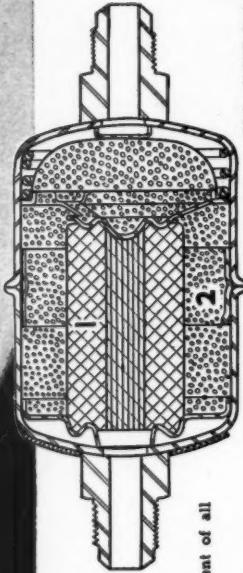


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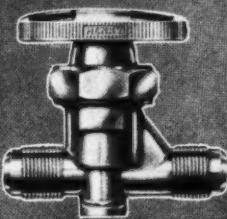
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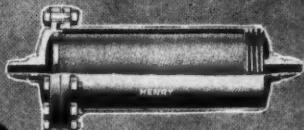
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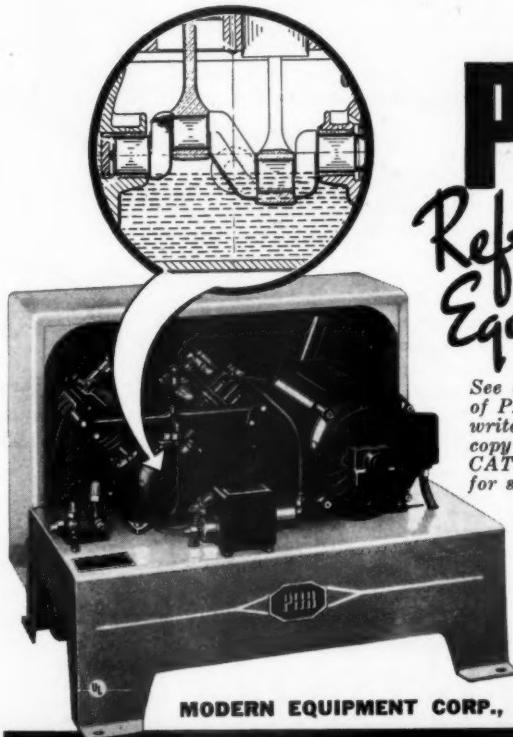
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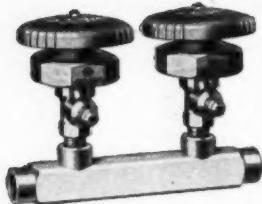
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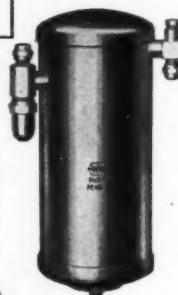
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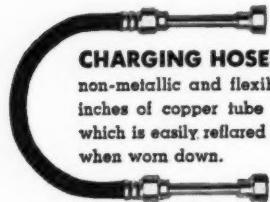
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The Refrigeration Service Engineer

Vol. 10

No. 4

April, 1942

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE
ENGINEERS SOCIETY

Published by
Nickerson & Collins Co.
433-435 North Weller Ave.
Chicago

Telephones Austin 1303-1304-1305

EASTERN OFFICE
420 Lexington Ave., New York City
Telephone Lexington 2-4816

Publishers of Technical Books and Trade Journals Serving the Refrigeration Industries for over 50 years.

Subscription Rates United States \$2.00 per year. Single copies 25c. All other countries \$3.00 per year.

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SERVICE ENGINEER

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★ MANPOWER AND MATERIALS ★ KEYS TO NATIONAL DEFENSE ★ -they must be conserved★



Defense requirements must come first. Demands are heavy—will be heavier—and they must be met. Hence, it is a patriotic duty to conserve manpower and materials—the twin keys to National Defense.

In laying out refrigeration and air conditioning installations, it is necessary to consider these factors. As the army grows—capable service men will be fewer—the answer is equipment that requires minimum service. If equipment is ineffective and has to be replaced, added and unnecessary loads are thrown on production machines needed for turning out military supplies. Additional materials must be used which may be needed elsewhere. Select equipment that won't have to be replaced.

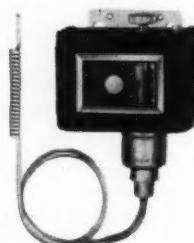
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The Refrigeration Service Engineer

Vol. 10, No. 4

CHICAGO, APRIL, 1942

\$2.00 Per Annum

Refrigeration Service Men to Be Registered by Government Under New Repair and Maintenance Order

THE repair and maintenance order is expected to be issued momentarily. At an Industry Advisory Committee meeting called April 2, by Mr. J. M. Fernald, Chief of the Air Conditioning and Refrigeration Branch of the War Production Board in Washington, the contents of the new repair order were read. Included in the provisions is a requirement that every refrigeration maintenance and service contractor be registered with the government. Telegrams have been sent to all manufacturers in the refrigeration industry to supply the War Production Board with a list of their authorized or franchised service organizations. It will then be necessary that a formal application be filed which will be furnished by the War Production Board and applications then will be passed upon by the Air Conditioning and Refrigeration Branch in Washington.

An A-1-a rating is assigned for immediate repair service for breakdowns in refrigeration and air conditioning equipment, used in wholesale plants for food preservation and processing. This priority rating will apply to all armed force refrigeration requirements, cold storage warehouses, meat packing plants, industrial applications for blast furnaces used in defense production

and other wholesale outlets of an essential nature.

An A-8 rating is extended for emergency parts and supplies to avert an immediate breakdown to the above listed equipment, also for the manufacturer of direct defense work as well as including *retail establishments using refrigeration equipment for the preservation of foodstuffs*. Food establishments, restaurants, milk stores, etc., will be classified under this rating where a breakdown has occurred.

An A-8 rating may be used to secure a minimum inventory of emergency supplies in order to avert a breakdown to the above classification of businesses, which rating may be also used for the securing of *household refrigerator* parts and supplies.

The above ratings will be extended by the "emergency service agency" to his wholesaler or manufacturer. It is evident that strict control will be exercised over this order and the principal purpose of the registration of service organizations is to exercise such control. In order to secure the A-1-a rating for the repair and maintenance of the larger industrial refrigeration plants the order had to be approved by the army and navy departments.

Refrigerant Hazards and Civilian Defense

By IRVING J. FAJANS*

In connection with his work of incorporating refrigeration engineers and service engineers into civilian defense and in reply to the many requests received from defense directors and wardens, Irving J. Fajans, author of this article, has set forth the relative hazards of refrigerants in case of air raids.

The information should be particularly useful at this time to those men of our industry who have identified themselves with civilian defense activities.—Editor.

THE growing need for adequate civilian defense makes it imperative that key-men be provided the necessary information relating to possible hazards due to escape of refrigerants under emergency conditions. The presence of gases when breathed with air, presents to the uninformed, a consciousness of fear and mystery. This feeling is a mental attitude, while not based on facts, is conjured from a lack of knowledge and excessive fear of consequences gleaned from comparisons of unrelated incidents or circumstances.

It is also recognized that where people are closely assembled, as in the case of air raid, refugee rooms, fear is the prime promoter of panic. This bulletin is conceived with the idea of dispelling this mysticism and fear, as in the case where refrigerant gases may be liberated by concussion and rupture of common refrigerating systems.

At ordinary temperature and atmospheric pressure, most common refrigerants are gases, and, in quantities as contained in the average home electrical refrigerator, if they escape, can diffuse through the air and be breathed by persons in the vicinity. Supreme care, however, must be exercised not to permit skin or eyes to come into direct contact with escaping gas, in its liquid form, as this will cause immediate freezing of the body parts so subjected.

* Aetna Supply Company, New York, N. Y.

The above you will note refers only to escaping refrigerants, in common home electrical refrigerators, and does not apply to larger commercial systems, such as are used in stores, hotels, warehouses, barracks, department stores, etc. Where ruptures occur to the larger units, only qualified persons, with proper equipment, should be permitted to enter the sections where such units are housed.

A more detailed description of the toxic effects and properties of the more common refrigerants employed will follow.

Effects of Inhalation of Refrigerants

If small quantities of refrigerant escape repeatedly, as in service or manufacturing operations, repeated exposure may result. Practical experience has indicated that no general hazard results from this type of exposure.

On the other hand, loss of large amounts of refrigerant as may occur in fire, air raid, or other disaster conditions may lead to serious potential hazards. Even under these conditions, however, adequate knowledge and suitable precautions can reduce the hazards to a minimum.

Where quantities of refrigerants are being handled, possible hazards due to ruptured lines, broken gage glasses, leaking joints, etc. must be considered. However, adequate knowledge and suitable precautions can reduce the hazards to a minimum.

Action of Irritants

Do not confuse irritation with corrosion. Irritation results in inflammation, which is a disturbance of the tissues and their normal functioning.

There is a great difference in the way irritants act when breathed, and this difference varies with their physical properties. Their solubility in water is one of the determining factors. Soluble gases react with

the moist tissues, which they first meet in the upper throat and trachea, and for this reason the resulting danger is less, for the upper tracts are tougher. The nose may be almost raw and still heal quickly and completely. The nearer the effect approaches the lungs the more complicated and dangerous it becomes.

Usually these irritants react chemically and cause inflammation of tissues. They seldom go into the blood in their original state, or if they do, no further damage results.

It can be safely stated that refrigerant escape by air raid, concussion, etc. and not accompanied by fire, will cause little or no physical damage or after effect.

Freezing Effects of Liquid Refrigerants

It should be borne in mind that all common refrigerants, contained in a refrigeration system, are kept under pressure in a liquid form.

Should the liquid be discharged, it will tend to change to a gas and in so doing will remove heat from the air or any object with which it comes in contact. Thus persons in the path of escaping liquid may be subject to a freezing action in addition to the effects of inhalation.

Discharge of Refrigerants under Fire Conditions

Refrigeration installations in all except the smaller sizes are ordinarily so designed as to reduce to a minimum, hazards due to fire conditions.

Large installations normally are provided with rupture discs or safety valves which will discharge the refrigerant through a vent line when the pressure becomes excessive.

Thus, under fire conditions, the refrigerant will be vented and no explosion of the refrigerating apparatus will occur. In smaller units, fusible plugs are commonly used which will melt and discharge the refrigerant before pressures become great enough to cause rupture of the apparatus.

Refrigerant cylinders, except service cylinders, are provided with similar fusible plugs.

Ordinarily, in all except large installations, release of the refrigerant will occur only when a considerable conflagration is already in existence and discharge of the refrigerant will probably not add much additional hazard although this danger should be considered.

Because of the pungent character of some refrigerants and the decomposition products of others, a gas mask should be used at all times, where entry is made into a burning building where refrigerants may have been discharged.

Flammability Hazards of Various Refrigerants

Butane and *Isobutane* Hydrocarbon refrigerants such as these are similar to naphtha gas but because of their limited use in small quantities little if any attention need normally be paid these materials.

Methyl Chloride. In being slowly discharged from a tube may be ignited and burns with a green flame. However, more rapid discharge of the refrigerant tends to blow the flame out and the fire hazard is not as great as might be expected. If sufficient methyl chloride escapes, an explosive mixture may form. However, discharge of at least 11.5 lbs. of methyl chloride per 1000 cu. ft. of space would be required before an explosive mixture could be secured.

Hence, except in machinery rooms or other places where large quantities of the gas might escape into a confined space, the danger of explosion is small. At points near the source of leakage, high concentrations of the gas might occur and local, minor explosions might be encountered in some instances.

Ammonia will burn and its ignition characteristics are similar to those of methyl chloride.

Ammonia in large concentrations in air will explode, about 6 lbs. per 1000 cu. ft. being required to produce an explosive mixture.

Carbon Dioxide will not burn or explode under any conditions.

Sulphur Dioxide will not burn or explode under any conditions.

Freon-12 will not burn or explode under any conditions.

Fire Decomposition Products

Ammonia burns to nitrogen and water—both harmless.

Sulphur Dioxide will not break down.

Methyl Chloride may decompose under heat to carbon dioxide and hydrochloric acid. A trace of carbon monoxide may be formed.

Freon-12. The chloro-fluoro derivatives of hydrocarbons such as Freon-12 break down

AMMONIA (NH_3)

TESTED FOR	PARTS PER MILLION BY VOLUME
Least detectable odor.....	53
Least amount causing immediate irritation to the eye.....	698
Least amount causing immediate irritation to the throat.....	408
Least amount causing coughing.....	1,720
Maximum concentration allowable for prolonged exposure.....	100
Maximum concentration allowable for short exposure ($\frac{1}{2}$ hour).....	300-500
Dangerous for even short exposure ($\frac{1}{2}$ hour).....	2,500-4,500
Rapidly fatal for short exposure.....	5,000-10,000

Anhydrous ammonia has been manufactured on a commercial scale and widely used since about 1890. In some cases—especially in ammonia manufacturing plants—individual employees have worked with ammonia during practically this entire time. Careful periodic medical examinations of these individuals reveal no sign of bad effects, either temporary or cumulative.

when the gas comes in contact with a flame. Phosgene (a very dangerous gas) is formed in appreciable percentage. Also hydrochloric and hydrofluoric acids are formed. The latter is one of the most corrosive acids we have and its action very serious.

These products of combustion, hydrochloric acid, hydrofluoric acid and phosgene are more dangerous than any gases now used as refrigerants.

As noted above, methyl chloride, Freon-12, and similar materials decompose to form acid gases. These gases readily form fogs in contact with streams or sprays of water and some hazard may result from this cause under fire conditions.

First Aid Treatment

AMMONIA. In general the first-aid treatment required following exposure to ammonia gas is to flood affected areas of the body with water or a boric acid solution. This is to wash away and neutralize excess ammonia and neutralize its alkaline properties.

In the event of being rendered unconscious by involuntary exposure to high concentrations, the patient should receive artificial respiration by the Schaefer method. Avoid any manipulation of the arms. In case of exposure to liquid ammonia, the affected areas of the body should be immediately bathed with water followed by a boric acid solution.

In case of severe injuries, first-aid treatment should be immediately supplemented by the care of a competent physician.

SULPHUR DIOXIDE (SO_2)

TESTED FOR	% BY VOLUME IN AIR	LB/1000 FT. OF SPACE
Least detectable odor.....	.0003	.0005
Least amount causing immediate irritation to eyes.....	.002	.003
Least amount causing immediate irritation to the throat.....	.0008-.0012	.0013-.002
Least amount causing coughing.....	.002	.003
Maximum concentration allowable for prolonged exposure.....	.001	.002
Maximum concentration allowable for short exposure ($\frac{1}{2}$ hour).....	.005-.01	.009-.017
Dangerous for even short exposure.....	.04-.05	.07-.09

Various investigations have substantiated the practical experience of men working in smelters, sulphite paper mills, sulphur dioxide factories that repeated exposure to even fairly high concentrations of sulphur dioxide produce no delayed or cumulative injury. Persons afflicted with asthma or other respiratory trouble may in some cases be adversely affected by sulphur dioxide and such persons should not be employed where repeated exposures may result.

SULPHUR DIOXIDE. Freezing of skin.
Temperature gradually restored.

Snow or ice water applied with massage of skin until color is restored.

Perseverance usually results in complete return of circulation. Alcohol dressing changed three or four times daily relieves pain. Blisters containing water or bloody fluid may develop later. Paint with antiseptic (tincture Methiolate (Lilly) or tincture Metaphen (Abbott)). With sterile scissors remove skin covering blister and release serum. Apply antiseptic dressing.

Eye Freezing. The watery reaction of the eye is usually sufficient to wash out the chemical. Boric acid solution may be used to wash out the eye. Household remedies for first aid relief of pain are milk or castor oil. Every eye freezing should have the services of a competent eye specialist to determine the presence of ulcer to prevent later infection.

Caution: DO NOT RUB affected eye.

METHYL CHLORIDE. Remove patient immediately from gas contaminated air. Administer artificial respiration if necessary. Administer a mixture of 90% oxygen and 7% carbon dioxide. Such a mixture is commercially available in cylinders. An H.H. inhalator may be used. Give by mouth sodium bicarbonate in water. Administer aromatic spirits of ammonia as a stimulant. Subsequent treatment to be prescribed by attending physician.

METHYL CHLORIDE (CH_3Cl)

TESTED FOR	% BY VOLUME IN AIR	LB./1000 CU. FT. OF SPACE
Maximum amount for prolonged exposure.....	.05-10	.7-13
Maximum permissible for 60 minutes.....	.7	.9
Dangerous in 30 to 60 minutes.....	2-4	2.5-5
Dangerous for even short exposure.....	15-30	20-40

Excessive exposure to methyl chloride develops the characteristic symptoms of drowsiness, mental confusion, nausea and possibility of vomiting.

While methyl chloride is relatively non-toxic, it must be borne in mind that all gases except pure air should be avoided, as they are more or less toxic or asphyxiating. Experience has shown that over a period of years, repeated exposure to quantities of methyl chloride incident to manufacturing and handling operations has not produced any trouble of a serious nature due to its physiological properties. In a few instances, short exposure to excessive concentrations of methyl chloride has resulted in an attack similar to alcohol intoxication. Recovery was complete within a short time and there were no after effects.

FREON 12 (CCl_2F_2)

In concentrations less than those sufficient to cause suffocation it appears that "Freon 12" is not harmful.

Exposure of eyes or skin to liquid refrigerant should be treated as described under sulphur dioxide.

FREON-12. First-aid treatment generally will be the same as described under other refrigerants.

Toxicity of Refrigerants

It is very difficult in cold figures to make a comparison of the various refrigerants to show toxicity. The warning action of a gas, the ability to detect a leak, the kind and degree of action resulting, the after-effect,

etc., all these must be taken into consideration.

It must also be borne in mind that while the original gas may be relatively harmless, it may change to a harmful chemical, or it may be decomposed by heat or flame, to harmful gases before it is breathed.

Suffocation

The human respiratory system is adapted to the inhalation of air. As a general statement it can be said that when more than 30% of any foreign gas is mixed with air the human body cannot properly function.

Commercial Refrigeration

Under this classification, we are grouping all classes of refrigeration (other than domestic boxes) and air-conditioning systems of all types and descriptions.

For safety purposes, refrigerants are divided in three groups:

GROUP 1

TRADE NAME	CHEMICAL FORMULA
Carbon Dioxide	CO_2
Freon-12	CCl_2F_2
Freon-21	CHCl_2F
Freon-114	$\text{C}_2\text{Cl}_2\text{F}_4$

GROUP 2

Ammonia	NH_3
Ethyl Chloride	$\text{C}_2\text{H}_5\text{Cl}$
Methyl Chloride	CH_3Cl
Sulphur Dioxide	SO_2

GROUP 3

Butane	C_4H_{10}
Isobutane	$(\text{CH}_3)_2\text{CH}$

TOXIC PROPERTIES OF GASES

REFRIGERANT	UNDERWRITERS' LABORATORIES CLASS NO.	KILLS OR PRODUCES SERIOUS INJURY % BY VOLUME	POISONOUS DECOMP. PRODUCTS	BOILING POINT DEG. F.	SP. GR. GAS ₀ (AIR = 1) O.C. 760 MM.
Ammonia.....	2	.05%-.6% ($\frac{1}{2}$ Hr.)	...	- 28.0	.59
Carbon Dioxide.....	5	290% ($\frac{1}{2}$ Hr.)	No	- 108.4	1.52
Dichlorethylene.....	4	2-2.5 (2 Hr.)	Yes	118	3.35
Freon -12.....	6	above 20% (2 Hr.)	Yes	- 21.7	4.18
Freon -114.....	6	above 20% (2 Hr.)	Yes	38.4	5.90
Ethyl Chloride.....	4.5	6-10 ($\frac{1}{2}$ -1 Hr.)	Yes	54.5	2.23
Methyl Chloride.....	4	2-2.5 (2 Hr.)	Yes	- 10.76	1.74
Methyl Formate.....	3	2-2.5 (1 Hr.)	...	89.2	2.07
Methylene Chloride.....	4.5	5.1-5.3 ($\frac{1}{2}$ Hr.)	Yes	103.6	2.93
Freon -11.....	5	above 10% (2 Hr.)
Sulphur Dioxide.....	1	0.7 (5 Min.)	...	14.0	2.21
Freon 21.....	4.5	10.2 ($\frac{1}{2}$ Hr.)	Yes	48.0	3.56
Butane.....	5	33.1	2.01

Of the above, the most common refrigerants used are Ammonia, Freon-12, Methyl Chloride and Sulphur Dioxide. The other refrigerants are not used in sufficient volume to create an extra hazard.

Carbonators Now Equipped with Hydro Electric Switches

THE new carbonators manufactured during the past year are now minus the old float control which was always a source of mishaps and consequent trouble. The float is now replaced with a new hydro electric switch.

All other parts of the new carbonators are the same as earlier models but the method of control is completely changed. The motor is now controlled through a switch mechanism by the actual rise and fall of the water in the sight gauge glass of the Bastian Blessing Carbonator, and while the mechanism is the same on other carbonators, it is enclosed in a metal cylinder instead of the sight glass.

When the water rises in the glass to a point where it contacts the short electrode as illustrated in Fig. 1, the motor stops, and when the water level falls below the long electrode, the motor starts. The actual operation of the relay itself may be described as follows: The relay is a double acting type operated by the electromagnet "M" as shown in Fig. 2. A flow of current through coil "S" energizes the magnet, drawing up the armature which closes the short circuit between terminals 1 and 2 and opens the short circuit between terminals 3 and 4. When no current flows through coil "S" the magnet is de-energized, the armature drops and closes the short circuit between terminals 3 and 4 at the same time opening terminals 1 and 2.

Terminals 3 and 4 supply power to the motor. Consequently when no current flows through coil "S" and the magnet is de-energized the armature drops and the carbonator will run.

Inversely, when current does flow through coil "S" the carbonator will not run. One end of the coil "S" is connected to the carbonator body, the other end is connected to the short electrode "A" in the water level glass and also to terminal 2 on the relay. The bottom or ground plate in the water level glass indicated as "G" in Fig. 2, is also connected to the body of the carbonator.

Water is a fairly good conductor of electricity. Therefore, when the water level in the gauge reaches a height where it touches the short electrode "A," this completes an

electrical short circuit from ground through coil "S" to electrode "A," then through the water to ground electrode "G." The resulting flow of current through coil "S" energizes the magnet "M," lifting the armature and stopping the motor.

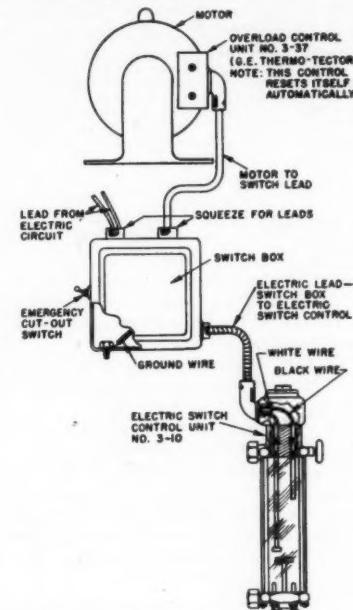


Fig. 1—The new water level switch shown here is contained in the water level sight glass. Others may be contained in a metal tube.

When the armature lifts, it not only opens the motor terminals 3 and 4 but it also closes terminals 1 and 2, and by referring again to the drawing, it will be noted that closing terminals 1 and 2, has the effect of connecting together both the long and short electrodes "A" and "B," both of which now form the circuit for coil "S."

Consequently, when the water level begins to fall below the bottom of the short electrode, the long electrode "B" will maintain

the circuit, keeping the motor idle until the water level finally falls below the bottom of the long electrode. At that point, of course, the circuit is finally broken. No current flows through coil "S" and magnet "M" is de-energized and the armature falls, starting the motor and simultaneously opening terminals 1 and 2. Naturally, water at once begins to rise in the glass and it might appear that the motor would stop as soon as the level reached the long electrode, but if you refer to the diagram you will see that with the armature in running position and terminals 1 and 2 open, the long electrode is connected into the circuit and the water level must rise to the short electrode before the motor will stop. Only when the motor is stopped is the long electrode connected to any circuit.

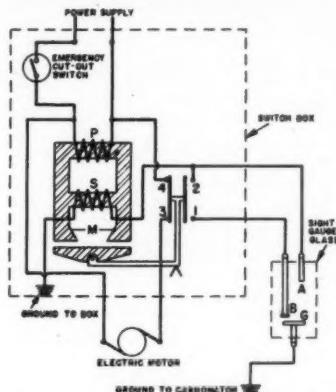


Fig. 2—A diagrammatic Circuit of the Hydro Electric Switch.

The initial energy or potential of coil "S" is supplied in the form of an induced current from coil "P" which directly connects to the building supply lines. This is accomplished by the upper portion of the magnet forming a transformer of which coil "P" is the primary and coil "S" the secondary. The current supplied, however, is very small—only a fraction of an ammeter, and is not in any way connected to the power lines.

This switch can be used only on A.C. and will be seriously damaged if connected to D.C. Service on this type of switch is very limited. There are few things which can cause trouble and such troubles as may occur are quickly remedied. If the carbonator will not start it may be caused by a drop of water, which is sufficient to bridge the gap between the long electrode and ground plate,

or on some models which are equipped with a metallic housing, a drop of water may hang between the long electrode and the housing. If the carbonator will not stop, check the magnet armature to see that it moves freely up and down, check for loose connections at the electrodes or ground wire. Check for open circuit in primary or secondary coils.

If the carbonator short-cycles, that is, starts when the water level falls below the long electrodes and stops after a few seconds when the water rises, make sure the switch contacts well, breaking the circuit properly. When the magnet armature drops, contacts 3 and 4 should meet and contacts 1 and 2 break clearly. Contacts 1 and 2 must separate at least $\frac{1}{16}$ inch and, if necessary, bend the contact arm slightly to assure the proper amount of separation to correct this condition. Do not change the electrode leads to overcome this trouble. If the black and white wires are reversed a short-cycle will continue to take place in the long electrode.

FIRST SERVICE FIRM TO GET TIRES

ONE of the very first Milwaukee firms to receive tires under the new rationing regulations was the Real Refrigeration Repair Service, 807 North 19th Street, which repairs refrigerators for hospitals and other large users. The board approved the company's application for three tires and three tubes, holding that the firm was eligible.

Application was made by Albert Reinhart, of the firm, who presented a certificate from a tire inspector stating that three of his tires were in need of replacement. Board 40—A granted the request, but first sent Reinhart back to the inspector for additional details.

MAKE EVERY CALL COUNT

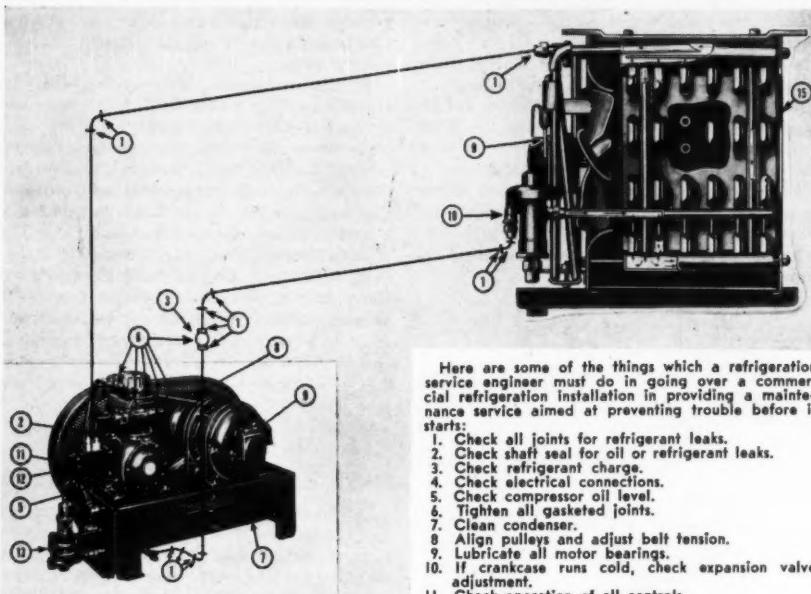
EVERY service call you don't complete on the first trip takes that much more rubber off your tires on the second one.

G. S. Devolk,
Waukegan, Illinois

After having purchased a few copies on the newsstand I have been wondering how I ever got along without it so long.

Prevent Trouble Before It Starts

Says G-E Field Engineer



Here are some of the things which a refrigeration service engineer must do in going over a commercial refrigeration installation in providing a maintenance service aimed at preventing trouble before it starts:

1. Check all joints for refrigerant leaks.
2. Check shaft seal for oil or refrigerant leaks.
3. Check refrigerant charge.
4. Check electrical connections.
5. Check compressor oil level.
6. Tighten all gasketed joints.
7. Clean condenser.
8. Align pulleys and adjust belt tension.
9. Lubricate all motor bearings.
10. If crankcase runs cold, check expansion valve adjustment.
11. Check operation of all controls.
12. Clean and polish control contacts.
13. Check and clean water regulating valve.
14. Remove oil from any rubber mounting blocks.
15. Clean evaporator surface.

THE refrigeration requirements of this nation's armed forces and of vital war industries, make it imperative that all civilian users of commercial refrigeration try in every way to make their present equipment last for the duration," states R. U. Berry, manager of the field engineering division of the General Electric air conditioning and commercial refrigeration department. "The best way to do this is to prevent trouble before it starts."

Modern electric refrigeration equipment, like the automobile, is a fine piece of machinery, he pointed out. Just as few auto owners are capable of making adjustments and repairs on their own cars, few commercial refrigeration owners are equipped to perform their own maintenance. The wisest and most economical policy in the long run is to rely on a competent service organization for regular supervision. Most of these organizations offer maintenance contracts, under which they will make periodic inspections, checking all parts of the equipment.

The cost of this type of maintenance service, said Berry, is a very small fraction of

the cost of replacements or repairs plus the business delays and losses occasioned by a single breakdown. Breakdowns due to carelessness or inadequate maintenance, he added, are not only bad business, they represent a set-back in our national war effort. Whereas there is recognition of vital importance of refrigeration in the preservation of food for civilian use and at present replacements parts of new units may be obtained in emergencies, there is no justification for needless replacement. This is waste, and uses critical materials needed for war work.

In conclusion, Berry said that despite the present availability of replacements for essential food refrigeration in civilian use the difficulties of getting such replacements will increase as the war continues. His organization is, therefore, now engaged in aiding General Electric dealers and distributors make this preventive maintenance service available throughout the nation.

"A Stitch in Time Saves Nine"

Theme of Wartime Service

THIS is the theme of a recent bulletin issued by Servel Inc. to distributors, dealers and service companies urging them to expand their service facilities and to promote preventive maintenance among their customers. The bulletin follows:

"We have been the most wasteful people on earth! We have used our natural resources lavishly. Without batting an eye we have discarded slightly used manufactured products which less fortunate peoples would have been glad to get, many times simply because the articles were out-of-style or because an improved type was available. These practices have been to some extent responsible for our vast consumption and production of manufactured consumer goods. Perhaps our posterity will pay dearly for our prodigality, but in the meantime we have been living the 'life of Reilly' as compared with other peoples.

"Now this is all changed. Conservation is the order of the day. Some articles that we had come to regard as almost necessities are unobtainable for civilian use. It has become necessary to reduce our usage of many other less strategic products. As a result, the general public is now conservation-minded and is in the mood to spend money on repairing and renewing old equipment. Probably it is a good experience for all of us.

"At any rate, now is the time to get out and establish your position as a repair agency that can do good work and whose service is prompt and dependable. As the war continues the repair business in all lines will increase and will be an even more important phase of equipment business than it now is and will tend to make up for any tendency toward reduction in other phases of business.

"See that your activities are properly organized to adequately handle this expanding phase of our business, and then go out after service business. A word of caution, though—be sure you are prepared or you may not only lose money but prestige as well. See that your servicemen are capable, fast workers; employ only the best you can get as they are the cheapest in the long run; check over your shop, tools and parts; ad-

vertise and publicize your ability and desire to aid in the conservation movement. Offer, perhaps, free inspections. Show your customers that by periodic inspection, oiling and minor repairs the life of the equipment can be greatly extended and the usage of electricity and the cost of operation can be held to the minimum.

Time Now to Begin

"This is a particularly favorable time of the year to begin such activities. Varying with the sections of the country, warmer weather is approaching with its heavier loads on the machines. Now, before the heavy spring rush (which will probably be much heavier than ever this spring) and while your servicemen are not so busy, is the time to check, readjust or repair these machines and prevent not only more serious trouble later, but also avoid the frenzy, overwork and overtime on the servicemen when the warm weather breaks.

"Attached is a suggested letter that could be mailed to users of refrigeration machines in your area and then followed up by a telephone canvass. This will bring in a great deal of additional service business. But whatever method used, *now is the time!*"

P. B. REED,
Service Manager.

Included with the bulletin was the following suggested letter to the user of refrigeration:

The War Effort is requiring that more men, more money, more factories, more machines and more materials be diverted from the production of civilian needs so that today we all realize that we should take good care of what we now have. In the not-too-distant future we may not be able to replace them—some things we can't replace now, notably automobile tires and mechanical refrigerators.

The old saying, "A stitch in time saves nine" never applied with more importance than it does now. Let's not wait for serious breakdowns, but instead let's keep our equipment checked over to catch little things that can be repaired or ad-

justed now with little work and at little cost, before they grow to the point where they will become expensive to repair and expensive from loss of food or other products stored.

Even before the "little things" grow to serious proportions, they are causing the equipment to operate less efficiently than it should so the cost of operation is higher than it should be.

Our refrigeration service department is

capable; our men are experienced and familiar with your equipment. Call us and have us check over your equipment. For a limited time only we will inspect your installation FREE and give you a FREE quotation if any repairs or adjustments are necessary.

Warm weather is not far off. Be prepared. Save needed strategic material and save money for yourself. Call us—'phone today.

Adjustment of Frigidaire Instantaneous Water Coolers

THE Frigidaire instantaneous water coolers Model SCW2X and CW2X used in various soda fountain installations, apparently are difficult to adjust for proper operation. Numerous inquiries from the service field indicate that strict adherence to the following instructions is necessary to obtain the desired results.

The instantaneous water cooler is composed of concentric tubes, one approximately 2 inches smaller in diameter than the other and placed within the larger tube to form a space about 1 inch thick between the two shells. Within this space, are approximately 30 feet of $\frac{3}{8}$ inch stainless steel tubing and 30 feet of tinned copper tubing. The tubing is flattened so that it is approximately $\frac{1}{2}$ inch wide and $\frac{1}{8}$ inch thick, and is wound in alternate layers. The space between the shells is almost completely occupied by the tubing but the available space around the tubing is to be completely filled with liquid refrigerant. The beverage or water to be cooled passes through the tubing and is therefore in intimate contact with the liquid refrigerant, which makes for nearly perfect heat transfer.

The space around the beverage coils must be completely filled with liquid refrigerant and this is accomplished by the use of the thermostatic expansion valve so mounted that the liquid refrigerant inlet is at the bottom of the cooler and the warm vapor is withdrawn at the top. The thermal bulb of the expansion valve is located in a well that is soldered to the outside of the inner sleeve where it is in metal-to-metal contact with the inner sleeves, as well as the beverage coils on the other side of the sleeve.

Control of the temperature of the water is by means of an LTV valve, a constant pressure valve, which will maintain absolutely a minimum pressure in the cooler; controlling the minimum pressure, of course, controls the minimum temperature, and consequently the delivery temperature of the water from the beverage coils. This limiting temperature valve can be located anywhere in the suction line of the cooler and not necessarily on the cooler; for practical purposes of adjustment on one fountain, it is mounted on the outside of the cabinet on the storage compartment end. This valve is adjustable within certain confined limits by means of a hexagon head $\frac{5}{16}$ inch bolt in the top of the valve. Unscrewing this bolt lowers the pressure and temperature, but it is so arranged that when it is completely unscrewed the pressure and temperature are still above the freezing point of water, and when it is screwed down to the warmest point—the pressure and temperature will result in a delivery water of about 55 degrees.

Charge Is Critical

The cooler, being designed to operate fully flooded with liquid refrigerant, is particularly sensitive to a shortage of refrigerant in the system. It is, therefore, of prime importance that the system be completely charged with refrigerant, and for the guidance of the service man, the cooler itself will hold about 5 lbs. of refrigerant.

The action of the limiting temperature valve is such that when warm water enters the beverage coils, the liquid refrigerant will boil, increasing the pressure, which in turn

opens the limiting temperature valve and allows the refrigerant vapor to escape to the compressor. When the water reaches the proper temperature, the boiling ceases, the pressure lowers and the LTV valve closes, cutting off the suction line. The cooler then remains idle until more warm water enters the coils. There is no water storage except the amount of water contained in the beverage coils, which is probably about 12 ounces.

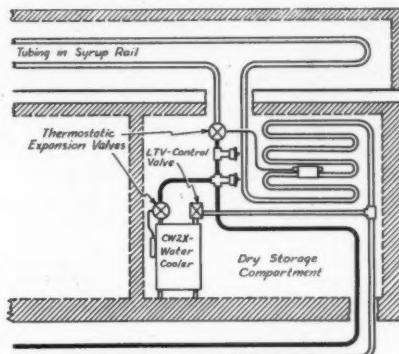
Since the beverage coils completely fill the space in the cooler from the top to the bottom, it is of utmost importance that the cooler be completely filled with refrigerant to make effective use of every bit of the beverage coil. This means that the thermostatic expansion valve must be adjusted to a point where it will maintain the cooler completely full of refrigerant.

Making the Adjustment

The service man, in adjusting the valves should first unscrew the adjustment on the LTV valve to the coldest point. The thermostatic expansion valve cannot be adjusted in the conventional manner to maintain a full flooded cooler because the LTV valve will always maintain the temperature above freezing, and therefore, there will be no frost line at the cooler. Therefore, the expansion valve should be adjusted sufficiently rich so that the entire cooler and suction line is filled with refrigerant after which the liquid refrigerant will slop over when the LTV valve opens and form a frost at the exit point of the LTV. When this occurs, the service man can be certain that the cooler is completely flooded. Of course, it is not desirable to have any great amount of frost at that point and the expansion valve can be backed off until there is just a faint trace of light frost or a heavy sweat at the exit of the LTV. It is important in making this adjustment to occasionally draw a glass of water from the draft arm so that warm water will be admitted to the beverage coils of the cooler while the adjustment is being made. It is not, however, good practice to leave the draft arm open—because this creates too violent a boiling action. The best method is to draw standard 6 oz. glasses of water at intervals of 30 seconds or more while the adjustments are being made.

The above adjustments are very important, as about 90% of all complaints on instantaneous water coolers arise from the fact that they are not perfectly adjusted either because there is not sufficient refrigerant in the system, or if there is, the expansion valve

is not open enough to admit it to the cooler. In making the above adjustments, it is a very good check of the refrigerant in the system, because if the unit is short of refrigerant, it will not be possible to obtain a frost out of the LTV. Consequently, this adjustment, if properly made, will check all the factors in the successful operation of the cooler. After the service man has completed



The CW2X. Water cooler shown in a diagram of a soda fountain system.

the above adjustment, the delivery temperature of the water at the draft arm will be about 37 or 38 degrees. This temperature is somewhat lower than is necessary or advisable, and it is recommended that it be increased by turning the adjusting screw of the LTV valve down about 3 complete turns. This will increase the delivery water temperature to approximately 42 degrees, which is adequate for practically all locations, and of course, the higher the delivery water temperature, the greater the cooling capacity of the cooler.

The adjustments given are all predicated on the fact that the compressor is of sufficient size to handle the average load, which means not smaller than $\frac{3}{4}$ hp. water cooled.

Glen Blake,
Richfield, Utah

I have spent a lot of money for service manuals, etc., but THE REFRIGERATION SERVICE ENGINEER is the best of all. I have only sent two questions to the Question Box but the answers to these questions alone were worth the price of the subscription. I find that 90% of the articles are valuable and worthy of keeping permanently for future service reference.

Unusual Experiences

Perhaps you too have had an unusual experience in some service job. If you have, this department will welcome an account of it in your own words.

CHANGING A G. E. HIGHSIDE FLOAT TO A CAPILLARY TUBE

A GENERAL ELECTRIC DR-2 monitor top refrigerator in my shop had a defective float and because I was unable to get a new float I decided to replace it with a capillary tube.

I pinched off the tubing from the condenser to the float and the liquid line between the evaporator and the float. I then cut the tubing at the bottom of the float and using a drift punch, punched out the seat of the float. I soldered a piece of $\frac{1}{4}$ inch tubing with a flare nut on it to the bottom of the float and soldered another short piece of $\frac{1}{4}$ inch tubing with a flare nut to a $7\frac{1}{2}$ foot piece of .012 capillary tube. The other end of the capillary tube was soldered into the pinched off liquid line.

I installed a small Zenith filter between the float chamber and the capillary tube, then hooked up a drum of sulphur to the adapter and opened it to get rid of air in the lines opened. I removed the pinch off tool from the liquid line and let gas come from the evaporator to the float chamber and purged to be sure of getting rid of the air.

After opening the line to the condenser I charged the system with $5\frac{1}{4}$ pounds of SO_2 and coiled the capillary tube alongside the evaporator. The reason I left the float chamber in was so that the appearance of the cabinet would not be spoiled.

This unit is now working better than it ever did with the highside float.

Robert F. Leet
Sioux City, Iowa

System Contained $1\frac{1}{2}$ Gallons of Excess Oil for Several Years

I HAVE had quite an experience with a $1\frac{1}{2}$ H.P. "Crano" (universal) Methyl machine. It has been in use for about six or seven years and during the past five years nothing has been done to it but add oil from time to time when it showed low in the oil glass on crankcase. I think I put in about a quart a couple of years ago. The oil was added by someone else at the other times. There were no leaks in the system.

Well, about a month ago I promoted the job of overhauling the compressor. I tore it all down and found a lot of gummy sludge in it, one piston had to be driven out, the other came out fairly easy. I cleaned it all up and reassembled it, putting in new valve discs. It ran fine for about ten minutes and then it started hammering so hard it would shake the machine. I said "too much oil," although I had only put in about three quarts which brought the oil level so that it could be seen in the glass. The whole system had been pumped down thoroughly before I started working on it. Well, I pumped it down again and removed more than one and a half gallons of oil from the crankcase during a period of about three or four hours and pumping it down a half dozen or more times to remove oil. Finally the oil level remained constant.

The machine operates satisfactorily now with the exception of a slight knock which never was there before I worked on it. I have taken it apart several times but could find nothing wrong with the exception of one connecting rod which had become "offset." This was straightened and is in perfect alignment but the noise is still there and is quite disagreeable inside the walk-in cooler which is operated by this unit. I have about arrived at the conclusion that the noise can never be found and am wondering if anyone may have any suggestions as to what might be causing this trouble.

It seems unbelievable that $1\frac{1}{2}$ gallons of oil could be trapped in this outfit for several years and all at once start coming back to the compressor after it had been overhauled.

S. J. Fort
Menno, South Dakota

PLASTIC TUBING TO REPLACE BLOCK TIN

FROM a New York distributor of plastic tubing comes the information that plastic tubing is being successfully used as a substitute for block tin tubing in soda water lines, beer lines and water lines.

This tubing is easily bent or flared with your regular flaring tool, simply by first dipping the tubing in hot water.

HOW TO CHECK A MOTOR CAPACITOR

FOR those who have trouble determining whether the capacitor is faulty or there is something else causing improper motor operation, here is a good test routine suggested by Century Electric Company.

If the starting (electrolytic) capacitor is faulty, the motor starting torque will be weak and the motor may not start at all but may run if started by hand.

If the running (oil-filled) capacitor on capacitor start and run motors is defective, the motor will heat, hum and tend to slow down after the cut-out switch has opened.

A capacitor can be tested for open circuit or short circuit as follows: Charge it with DC (if available), preferably through a resistance or test lamp. If no discharge is evident on immediate short circuit, an open or a short is indicated. If no DC is available, charge with AC. Try charging on AC several times to make certain that the capacitor has had a chance to become charged.

Loss of capacity can be checked as follows: Connect AC ammeter between phase winding and line 1. Measure the AC current input in amperes and the voltage across the capacitor terminals. Then

$$C = \frac{1 \times K}{E}$$

C = Capacity in microfarads

I = Current input in amperes

E = Voltage across capacitor terminals

(= 2650 on 60 cycle circuits

K (= 3185 on 50 cycle circuits

(= 6370 on 25 cycle circuits

If C found in this way is much less than the microfarads stamped on the capacitor, loss of capacity is indicated. These readings should be taken during the starting period, but if the motor will not start, quick readings at the moment the starting switch is closed will suffice.

If capacitor is open, short circuited or weak—replace. Replacement capacitors should not be of lower capacity or voltage than the original. In soldering connections, do not use acid flux.

Electrolytic capacitors if exposed to temperatures 20° F. and lower may temporarily lose enough capacity so that the motor will not start, and may cause the windings to burn up as the heat generated by the stalled motor will not heat the capacitor in time. Temperature of capacitor should be raised by running the motor idle or by other

means. Capacitors should not be operated in temperatures exceeding 165° F.

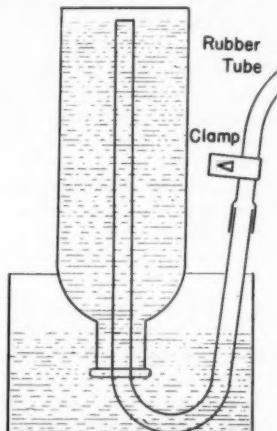
Frequency of operation of electrolytic capacitors should not exceed two starts per minute of three seconds acceleration each, or three to four starts per minute at less than two seconds acceleration, provided the total accelerating time (i. e., time before switch opens) does not exceed one to two minutes per hour.

Excessive load may be approximately determined by checking the ampere input with the nameplate marking. Excessive load may prevent the motor from accelerating to the speed at which the governor acts and cause the phase winding to burn up.

MEASURING NON-CONDENSABLES

HERE is a very simple arrangement for measuring non-condensables in the refrigerating system which is particularly useful when purging hermetic units.

A quart bottle, a piece of $\frac{1}{4}$ inch copper tube, a length of rubber tube, a clamp for the rubber tube, and a small container is all that is necessary to the equipment.



Fill the bottle full and turn it upside down in the small container, then start purging very slowly so that the refrigerant will have time to be absorbed in the liquid. Air and non-condensables will force the liquid out of the bottle.

The liquid used can be water for Methyl, lye solution for Sulphur and kerosene for Freon. Its purpose is to absorb the refrigerant vapor thus leaving only air to be measured.

COMMERCIAL

INCREASE BUSINESS BY
DOING A MORE EFFEC-
TIVE JOB OF SELLING

Selling

Selling Specialized Service Has Advantages

Service on Two Makes Only Has Proved Successful Plan

By B. K. Anderson

This firm concentrates on Leonard and Kelvinator market and makes mileage charges for distant calls.

ACTUALLY the Jones Refrigeration Service Company of Kansas City, Missouri, has turned down many service calls simply because: "They aren't our specialty."

On initial appraisal this doesn't look like good business, but once the Jones' reasons are considered, the policy takes on new importance.

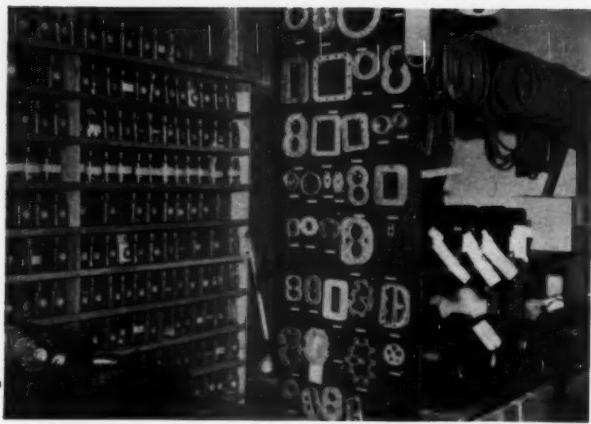
In the first place, Jones' reason, there is the important matter of keeping the employees training period at its minimum. Certainly it requires less time to train new employees in servicing two makes than it does to teach them to service a dozen difference kinds of refrigerators. Not only are they able to take care of service calls by themselves sooner but the general quality of "new" men's work under this plan is much better.

Then there is the matter of carrying spare parts to the job. By concentrating

on this limited number of makes they can carry practically everything in the replacement line that they will need. There is no trip back to the office for parts or additional equipment. The same advantage is realized in the firm's stock room. Here the number of parts can be limited and a much fuller inventory of units daily needed can be carried without additional investment.

Then there is the factor that a specialist can always leave a better impression with the customer because he is not likely to be stumped by any part of the job, doesn't have to run out or call out for additional parts, is able to do the job in shorter time and more satisfactorily.

The firm's advertising also is given additional prestige as well as a very valuable additional selling point. As this firm works this out in advertising copy, "We are not jack-of-all-trades refrigeration men, but highly trained engineers in these particular units." With most local refrigerator owners (as determined by recent surveys) selecting their refrigeration service firms through competing advertisements



"Let's save time by not running around after parts" say Jones Refrigeration Service Co., Kansas City. This view shows the small unit's section (stored in glass jars), gaskets, belts and motors.

in the yellow pages of their telephone book, Jones' are convinced that this strong selling point often balances the selection in their favor.

There is also the "Authorized Service" stamp and approval with the additional profit, prestige and sources of new business it brings, which Jones' consider one of their most important new contact getters.

One of the largest service firms in the Kansas City area, Jones' cover an area that extends approximately 20 miles in all directions from their shop located in the city's industrial section. In the city proper calls are made on a \$2.00 minimum basis, but outside the city limits (including neighboring towns and rural areas) an additional charge of five cents per mile is made unless the customer is willing to wait until other calls in the same area are to be made.

Actually Jones' do work on refrigerators other than those bearing the Leonard and Kelvinator label, but they don't work on these units during peak periods when they are operating at capacity nor do they devote any of their sales promotional effort in that direction. Also, due to a business connection with a local distributor, they have also recently accepted the Authorized Service for Mayflower Refrigerators and shall shortly give its service the same emphasis they now devote their "regular" two.

Their commercial and air conditioning service business, as far as sales promotion and advertising is concerned, is a separate function of the firm and amounts to about 30 per cent of the company's volume. It is kept in regular contact through direct mailings and personal calls, but unlike most other refrigeration service firms in their area, Jones' don't want the commercial business to become their most important source of revenue.

As they explain it: "We feel that domestic or home refrigeration is the most neglected branch of the service business—and it can easily be the most profitable. In the past most firms have given their commercial customers all the best of it and the domestic refrigerator owners know it and resent it. When these latter customers find a company that appreciates and shows they want the home business they aren't slow in passing the word along to their friends.

Customer Impressed with Service

"It impresses a home customer when you drive up to her house with a car full of parts for just her type of a machine, when you answer her call speedily, when you are able to quickly locate and remedy the machine failure or make replacement even if this calls for a loaned motor. It's this kind of service that gets new business and holds the old."

Nor do Jones' overlook the fact that commercial customers have the habit of price shopping around for their refrigeration service and often require the service firm to "carry them on the books" over

No hunting for parts at Jones. These metal cabinets carry a full stock, furnish a visual inventory and furnish a good profit through sale of parts alone.

an extended period, which is not the case with domestic customers.

Also dealers in air conditioning equipment, Jones' find that homes supply a surprising number of leads in this connection and, again, are the most neglected market.

In keeping with their policy of "never chasing around after parts," Jones' have patterned their Parts Department after the fashion of motor car and regular refrigeration dealers' stock rooms. Small units are stocked in small glass jars stored on metal shelves. These jars carry description and invoice number and carry visual count of stock. Larger units all have their regular place in the firm's stock room, including motors, furnishing the same visual inventory.

Full Stock of Parts Carried

It is the company's opinion that, today particularly, full stocks of parts should be carried at all times for customers are daily devoting more attention to making their present refrigerators last longer and frequently will call the service company before complete machine break down.

One of their area's largest strictly service firms, Jones' use 10 service cars in the peak season and keep 3 units going the year around. There are also two regular shop men. W. R. Jones, formerly service manager for Richards-Conover Hardware Company, (former area distributor for Kelvinator and now Mayflower distributor) is owner and manager of the company now in its third year.

Jones' advertising to the domestic trade is limited largely to Yellow Pages, classi-



fied as to the brands specialized in and featuring 24-hour service. The \$2.00 minimum call charge takes care of the first hour and the charge is \$1.50 per hour after that with replacements, of course, additional. Price of these replacements is kept in line with competition in the area but broadly the firm believes that a 100 per cent mark-up is essential. (Price to customer should be double cost.)

Car Stocks Replaced Automatically

As each service man brings in his job ticket, parts replacements in his car-stock are made automatically thus the service car is never faced with the necessity of making an extra trip back to the office for parts.

On the firm's regular, year-around staff one of the service cars and engineers specializes on commercial work and the other two take the domestic jobs. The company uses three large sections of the same building: one for office and parts department, another is the shop and the third is being developed into a paint room.

Early 1942 service calls have convinced them home refrigeration customers, in the months ahead, are going to depend more and more on their refrigeration service company to help them meet home refrigeration needs—and as Jones' say:

"That's the business we want and we're letting them know it!"

Service Engineer's Ingenuity Overcomes Waste Cost

By Robert Latimer

AN excellent example of how a little constructive thinking can go a long way toward securing army-cantonment refrigeration contracts for the refrigeration service engineer was recently furnished by George W. Mims, president of the Mims Frigid Refrigeration Service Company of New Orleans, Louisiana, largest authorized service dealership of the city. Mr. Mims, in addition to keeping up a huge business in preventive service for commercial installations over the New Orleans territory, has handled some of the largest Army refrigeration installations made in the South—and whether the installation is for the corner grocery store or for a 35,000-man training cantonment, he believes in building in as much operating economy as conditions will allow.

Mr. Mims' army contracts have included all refrigeration for a huge meat, vegetable and produce warehouse at Camp Shelby, Mississippi, and 900 conversion refrigeration units for former ice boxes purchased by the army for cantonments, hospitals and distribution stations at Camp Livingston, Camp Polk and Camp Claiborne, Louisiana. The icebox conversion contract, calling for 898 one-half horsepower Westinghouse compressor systems, was handled complete in two months by a crew of twenty employees, including ten refrigeration service men from the New Orleans shop, and ten helpers hurriedly enlisted to get the huge camps in operation. This, incidentally, was the fastest time on job-completion recorded on any refrigeration installation in the country, as Mr. Mims

and his crew averaged from 25 to 30 installations per day. This swift work, coupled with the fact that Mr. Mims at the same time developed a solution for most of the waste-expense problems occurring at previously-built cantonments, was responsible for a rate of \$85 per installation, considerably higher than had been paid on any other refrigeration work.

Solving these problems meant a little conflict with army specifications, particularly at Camp Livingston, Louisiana, where 436 ice boxes (No. 7 and No. 8 U. S. specifications) were converted to electric refrigeration for messhalls and kitchens serving 30,-



Mr. Mims and his crew of 20 refrigeration men beginning the conversion job of 900 former ice boxes in Camp Livingston.

000 trainees. In each kitchen the predominance of gas heated equipment burning high B.t.u. natural gas, kettles, ranges and other heat-load producing equipment had resulted in average temperature of 110 degrees, throwing a severe strain on refrigerating compressors cooling the reach-in boxes. In other camps built along the same lines, the high temperature resulted in continuous high pressure operation of most refrigerating units, and the large amount of grease and dust accumulated had necessitated the removing of gummed-up condensers for cleaning as much as once every two months. In addition, the almost continuous operation of the cooling units was absorbing a heavy amount of power, in some instances almost twice what ordinarily should have been required, according to Mr. Mims. Lastly, fighting high heat load conditions daily, most of the earlier installations had been unable to maintain satisfactory temperatures.

After a consultation with army engineers Mr. Mims developed a simple idea for cooling more efficiently every one of the 436 units at Camp Livingston, and to develop a saving per year of \$20,000 for power costs alone—actually enough saving over a five-year period to pay the cost of the entire equipment installation. Though it required a certain amount of argument and quite a bit of demonstration, Mr. Mims convinced the construction quartermaster of the necessity of special cooling for all compressors.

The solution developed was simply sealing off each of the $\frac{1}{2}$ horsepower Westinghouse units from kitchen heat under a plywood enclosure built at the rear of the box. First, Mr. Mims and his crew cut a square opening in the kitchen building floor measuring 1x2 feet, this to one side of the condenser. Over this was placed a fine screen wire mesh to extract dust and particles from cold air brought up from under the building. Then, with the rear wall of the box forming one wall, the units were all enclosed in quarter-inch plywood paneling on both sides and top, with a removable outer wall secured by snap hooks. Thus completely boxed in, each unit is entirely sealed off from the kitchen's heat and grease, while still readily accessible for repairs or checking. Cold air coming up through the large screened hole is more than adequate to cool the refrigerant, and has eliminated the need for frequent condenser removal for cleaning almost entirely. Costs for plywood, screen wire and carpentering were only \$10,000, as against a proved \$20,000 per year saving in power costs estimated after army engineers tested Mr. Mims' improvements.

Other camps are adopting the individual-unit-housing idea, according to Mr. Mims, while Camp Livingston expects to save \$100,000 over a five-year period, more than enough to cover the cost of installing the equipment.

Mr. Mims didn't stop with the refrigerating equipment, however. Inside the box, he has developed a system of baffle plates around the Peerless dome cooler used in each unit to guard against bypassing of circulated air which it was found concentrated most cooling at the

top of the box and resulted in spoilage of foods stored on the lower shelves. A complete system of baffle plates, guiding the circulation of refrigerated air from dome cooler to lower corners of the box and realizing a larger cooling capacity per minute has made every converted box more efficient—and these two innovations have helped to bring in a large amount of additional army installation work for this enterprising Louisiana refrigeration engineer.

Dealers Plan for Service "Streamlining"

THE refrigeration and other appliance service departments of prominent appliance retailers and distributors in Milwaukee will be "streamlined" with the addition of new equipment and better service methods shortly, as a result of a special meeting on the subject held by members of the Wisconsin Radio, Refrigeration and Appliance Association held recently. At the meeting, which was a "service clinic" held at Hotel Ambassador, dealers were asked to discuss their own ideas for building up a service business from among satisfied customers already sold major appliances, and to publicize these for open forum discussion. One dealer suggested the wisdom of "preventative service" whereby appliance users can be sold on the idea of an inspection and adjustment of refrigerators, washing machine motors, range burners, etc., to prevent later breakdowns. It was voted to adopt this plan by most of the retailers attending.

At the same time the chief topic was "streamlining" of service departments to do a better job with probably fewer men in the experienced-labor shortage. "The service department in both retail and wholesale appliance firms is likely to become the salvation of the business instead of a headache in the near future," H. L. Ashworth, manager of the association, said. "If appliance dealers are going to survive this difficult period, it will be largely through maintaining contact with their previous customers and selling service instead of merchandise."

Liquor Stores Refrigeration Helps Memphis Dealers Meet Conditions

By Herbert Hanley

A UNIQUE form of appliance business has been built up by Frank M. Hayes, Philco dealer in Memphis, by specializing on display refrigerators for use in Memphis' 600-package liquor stores, which are among the most handsome in the country.

Hayes, who operates a "drive-in" major appliance business with a showroom converted from a former filling station, has personally sold most of Memphis' package liquor dealers on the wisdom of using 10, 12 and 14 cu. ft. refrigerators in their stores for chilled wines, champagne, gin and other liquor served best when cold. Five years ago, when he received three trade-in refrigerators of 10-foot size on an apartment house sale, he couldn't sell the large boxes to his regular customers. They sat around in the stockroom for several months, until Hayes hit on the idea of selling them to neighborhood liquor stores to replace ice chests in which most stores were keeping cold wines, beer, etc. Accordingly he polished up the three large boxes, took them in a truck to the liquor store operators, and sold all three of them in a single day. Most store owners, it was found, thought enough of the appearance of the big refrigerators to put them in the center of the store where they attract attention and invite customers to buy liquors already pre-chilled to the correct temperature for cocktails, table service, etc.

When two more large boxes were received in trade, Hayes went out again and sold these just as easily—with the result that he went into this phase of his business aggressively. He put in a stock of commercial refrigerators of all sizes, including chiefly those with glass doors through which merchandise could be seen, and began using direct mail to members of the local retail liquor dealer's association, pointing out that all stores using refrigeration were selling more wines, cocktails and mixers than before. Results were

good in every case, Hayes having trouble keeping up with orders and interested prospects. He offered standard time payment plans on new and used large capacity refrigerators, and allowed many smaller stores to make small weekly payments from their sales. "I didn't have to make a single repossession" he states.



Large refrigerators of 10 to 14 cubic foot capacity, equipped with glass doors make ideal displays of wines for liquor dealers.

Now, after four years, more than 450 of Memphis' 600 modern liquor stores (including suburbs and small towns around the city) are using handsome large refrigerators as a stock part of store fixtures, all selling a larger volume of wines, bottled cocktails, gin, champagne and other liquors. Of course, Hayes didn't sell them all, but his customer list embraces the majority. Under war conditions, this business will help to keep the store going, and particularly, to keep his service shop operating with a full crew. Hayes has devised a service plan whereby he will keep every store refrigerator in good condition on a contract basis, and expects to be busy with this field alone. Continual operation of the units, plus the need for repainting and new parts from time to time, will supplant domestic service and sales as long as the war lasts.

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Cork Stocks Relieved by New Fiberglas Board

PRODUCTION by Owens-Corning Fiberglas Corporation of its new AE (asphalt enclosed) Board for low-temperature and roof insulation marks a development of unusual importance in that it releases the United States from dependence upon cork in meeting the tremendous war-created demand for cold storage refrigeration of perishable food supplies and industrial materials.

AE Board is made of pure glass fibers, compressed to a density of six pounds to the cubic foot, and completely enclosed in a sheath of durable asphalt that has a high melting point. Its heat conductivity is 0.265 B.t.u. per square foot per hour, per °F., per inch thickness, at a mean temperature of 60° F. This is one of the best values of all recognized cold storage insulations.

The new Fiberglas AE Board becomes available at a time when partial or complete curtailment of importations of cork might otherwise have proved a serious menace to health, and a heavy drag upon the ability of industry to meet the requirements of the war program. Since the new insulating board is made of materials which are found in adequate quantities within the United States, a supply sufficient to meet all essential needs is assured.

While Fiberglas insulation has demonstrated its value over a period of years, as medium and high-temperature insulation in thousands of domestic and industrial in-

stallations, the development of a Fiberglas insulation for low-temperature installations presented a new problem, due to the necessity of reducing moisture penetration to an absolute minimum. That this problem has been solved is shown by the AE Board's low moisture absorption by immersion, or in a humid atmosphere.

previously dry conditions was 0.064% by weight.

Fiberglas AE Board is made in the "American Standard" size for refrigeration insulation—that is, 12 inches by 36 inches—and in thicknesses of one, one and a half and two inches. Blocks are formed with true square edges and corners, and the asphalt coating is thoroughly sanded to prevent adhesion of the blocks to one another during shipment or while in storage.

The asphalt coating provides a substantially waterproof seal completely around the Fiberglas insulation. It also increases the stiffness and rigidity of the insulation so that the blocks can be used for the erection of self-supporting partitions, or as load-



Illustrating the operations followed in applying Fiberglas AE Board. Just prior to application the board is dipped in hot asphalt so that all edges are thoroughly coated.

(A) shows treated wood skewers driven diagonally into the board about two inches from the edges. They serve as handles for the dipping operation.

(B) shows dipping the board in hot asphalt, using the skewers to hold the board.

(C) shows the board lifted out and being drained of excess asphalt.

Note that one face and all four edges are dipped.

(D) shows the board pressed into position before the asphalt cools.

The second and all subsequent layers are skewered to the preceding layers by driving home the skewers previously started. All joints are

staggered with respect to each other, both vertically and horizontally.

After being completely immersed in water at 78° F., for 196 hours, the AE Board showed a gain in weight of 90.5%. Similar tests on several other low-temperature insulation materials showed gains in weight ranging from 64 to 261%. When exposed in a humidity cabinet at 70° F., and 65% relative humidity, the moisture pick-up from

bearing insulation to carry floors in refrigerated spaces.

AE Board is light in weight a factor of major importance, particularly in roof insulation, since it will permit engineers to effect a material saving in the supporting structure, thereby reducing costs and conserving materials for the war program.

All special-size pieces can

New and Improved Appliances

be made up on the job by cutting the board to size, and sealing the cut edges with hot asphalt. The material can be sawed with an ordinary wood saw if the blade is frequently lubricated with kerosene to prevent the asphalt coating from gumming the teeth. For curved surface of large radii, the board can be slotted on one face and bent to fit.

Immunity to rot, decay and fungus growth are other characteristics possessed by the new Fiberglas insulation. It is regarded as a fire retardant. It is odorless in low-temperature service and will not absorb odors. It provides no sustenance for insects or vermin, and presents a barrier which discourages penetration by rodents.

Extra-Small Sockets

KOWN as the No. V51 Set, this 18-piece assortment of $\frac{3}{4}$ -inch square drive sockets and attachments is designed especially for adjustments to the many small nuts and bolts found on cars, trucks, busses, airplanes, electric refrigeration systems, etc.



It is ideal for work on radios, starters, ignition parts, carburetors, heaters, aviation instruments, generators, small electrical apparatus, etc. Contents include eight sockets

with openings from $\frac{3}{16}$ inch to $\frac{1}{4}$ inch for adjustments to hexagon nuts and bolts; three sockets with openings from $\frac{1}{4}$ inch to $\frac{5}{16}$ inch for square nuts and bolts; 4 $\frac{1}{2}$ -inch sliding "T" handle; 2-inch and 6-inch extensions; 4-inch flexible extension; 6-inch spinner handle; 5 $\frac{1}{2}$ -inch hinge handle and 3 $\frac{1}{2}$ -inch cross handle.

All pieces with the exception of the spinner handle are made with rust-resistant finish. Socket walls are thin for getting in to close quarters, but of exceptional strength. All attachments are slender for reaching the "hard-to-get-at" places but because of their full length heat treatment have that strength for which all Bonney Tools are famous.

The entire set is furnished in a pocket size metal case which measures only $6\frac{1}{4} \times 3 \times 1$ inch. Complete the set weighs only 1 $\frac{1}{4}$ lbs. Full details may be obtained from Bonney Forge & Tool Works, Allentown, Pa.

A-P New "Trap-Dri" Unit

DESCRIBED as the only unit on the market that actually dries, strains and filters the refrigerant, the new A-P "TRAP-DRI" stops all impurities such as acid, moisture, gummy deposits, scale, dirt, solder particles that may be in the refrigeration system. Eliminates all danger of damage to the system, permitting smooth operation and preventing freeze-ups.

The new "Trap-Dri" combines the advantages of the

well-known "Trap-It" element, plus silica gel. The "Trap-It" element consists of a honeycomb tube, equal in efficiency to a 900-mesh strainer. The silica gel unit is capable of absorbing 12 to 16 percent of its weight in water— $1\frac{1}{2}$ to 2 times more effective than other dehydrating agents. An important feature of its construction is also the fact that it offers no appreciable pressure drop when used on the system. Out-

side shell is of cold rolled steel, made in two pieces, atomic hydrogen welded and tested against hundreds of pounds pressure.

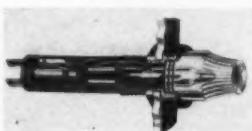


The "Trap-Dri" may be installed ahead of any expansion valve—or attached directly to the valve by a special fitting. It starts "cleaning up" the system immediately upon installation. Generous wrench grips permit easy and quick installation. "Trap-Dri" Units are available in several sizes and capacities to fit any refrigeration system. Inlet and outlets are $\frac{1}{4}$ -inch and $\frac{3}{8}$ -inch SAE male flare. Diameter, $2\frac{1}{8}$ inch. Lengths vary with capacity, governed by the amount of silica gel, ranging from $4\frac{3}{4}$ cu. in. to 14.7 cu. in., making a total length per unit of 4 $\frac{1}{2}$ inch to 8 $\frac{1}{2}$ inch.

Indicator Light

THIS is the time, trouble, and money saving service rendered to remote control by an indicator manufactured by Littlefuse Inc., Chicago.

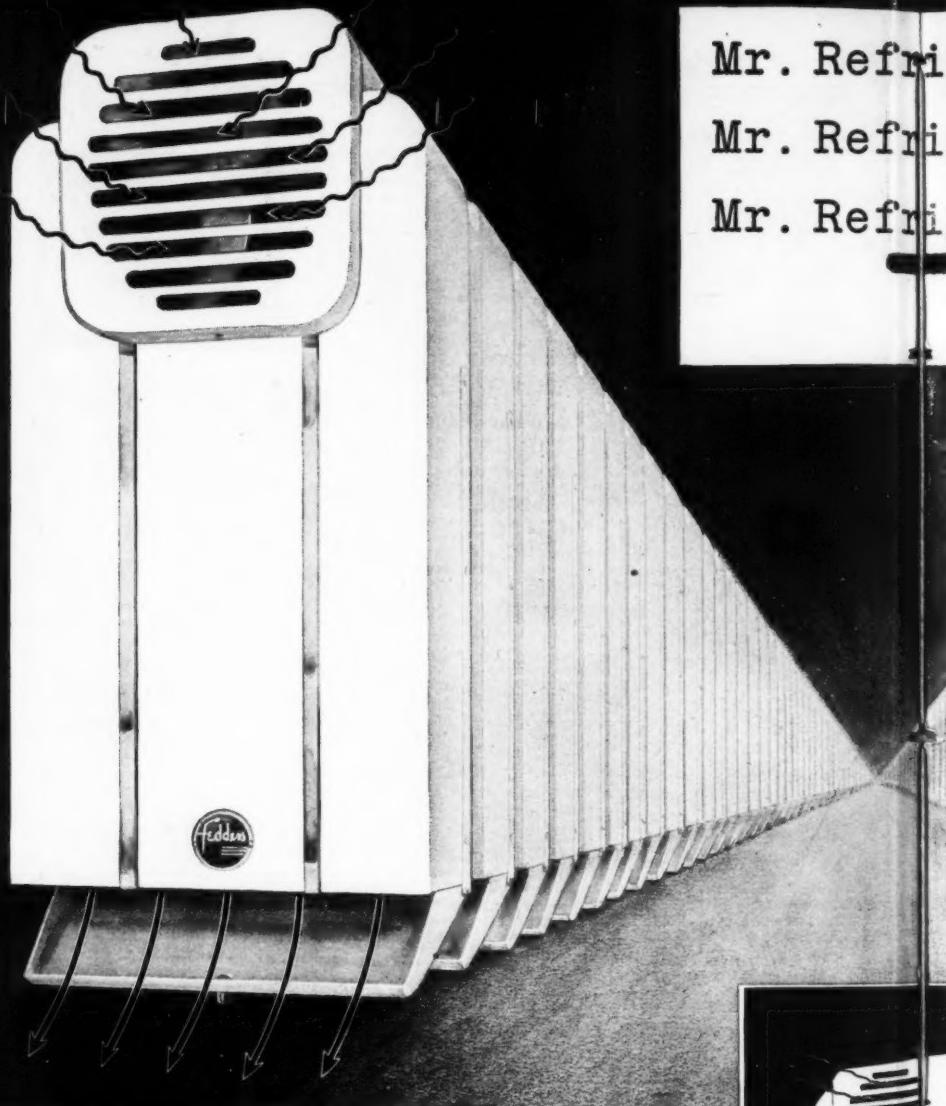
When installed at any convenient or desirable point in connection with remote motor control it works instantly, with a plainly visible signal to show "on" or "off." When the circuit breaker opens the light goes on.



It can be had for 24 or 48 volt filament bulb, with which no resistor is used. Otherwise it uses a built-in 200,000 ohm protective resistor, in series with a neon lamp.

The Littlefuse Indicator, or panel mounting No. 1414, has a black bakelite body, and transparent molded cap.

Mr. Refrigerator
Mr. Refrigerator
Mr. Refrigerator



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fedders

BUFFALO, N. Y.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

METER MISER FOR ICE CREAM FREEZER

QUESTION 481: I have a Frigidaire unit "Meter Miser." It is out of a box around seven years old. This unit is cut down with an Airflo Condenser mounted on top with a condenser fan behind it which works out perfectly for what I am going to use it—an ice cream freezer two quarts in size.

The compressor develops only 40 lbs. head pressure and then cuts out on relay. I had this unit charged with Freon. Will I have to use the gas originally charged with or is the compressor defective? Would it pay to get a rebuilt compressor or won't it work anyway? I would like to build just a small freezer as I have several makes of used refrigerator units on hand.

Also, what size and how much tubing must I use in my brine tank? I have a motor driven freezer.

ANSWER: I'm afraid that you will not be able to charge a Meter Miser unit with F-12 and expect it to operate with any satisfaction. The boiling point of F-114, which is the refrigerant the Meter Miser was originally charged with, is 38.4° F. This refrigerant would operate with a head pressure of approximately 30 pounds. F-12 boils at a temperature of -22° F. and normal operating head pressure would be from 120 pounds to 130 pounds. These figures alone will indicate to you why your motor is overloaded and the safety switch operates on the unit.

Further than this, however, by replacing F-114 with F-12 you are more than doubling the capacity of the unit and at the same time more than doubling the load on the motor. Naturally, when the motor is so much overloaded, the cut out switch will trip the relay and stop the machine. If you cannot obtain F-114 for this unit I might suggest that you try either Isobutane or Herveen. Herveen is a replacement gas put on the market as a replacement for F-114. You can secure any quantity you wish from your jobber.

I am rather doubtful about the success you are going to have with this unit even after you get it to operate satisfactorily. The reason for this is that I am afraid you will find it takes too long to freeze two

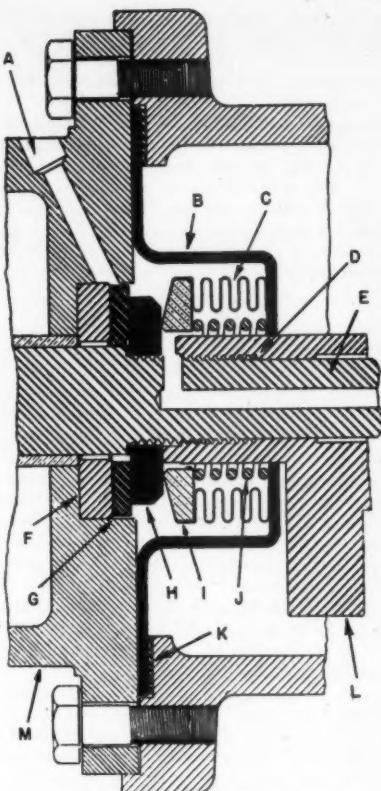
quarts of ice cream with the small capacity you will have in the Meter Miser. Without determining exact figures at this time, it requires the removal of approximately 300 B.t.u. from two quarts of ice cream to change it from the state known as "the mix" to the hardened or finished product. At this rate of going, I believe that it will take your Meter Miser unit two hours or more to do the job. Further than this, when using F-114 or one of the replacement gases which will operate satisfactorily in the unit, you will have to operate on a low side pressure of from 20" to 22" vacuum which is an extremely low pressure for any unit to maintain and produce any amount of refrigeration.

SPARTON SEAL LEAKS

QUESTION 482: I would like to know how the Sparton seal keeps the gas from escaping. I have installed a seal but the gas comes out from the seal oil cup. Could you please tell me how to prevent it? As far as I can see there is nothing to prevent the gas from coming out either from the oil cup or through the electric motor drive shaft. Also, what is the large opening or oil cup used for? It is located between the motor and seal on the side under the oil cups.

ANSWER: The Sparton unit is the same as the Gibson unit, manufactured from about 1932 to 1934. If you are familiar with the Gibson and the construction of its seal, you also will be familiar with the Sparton.

The October, 1939, issue of **THE REFRIGERATION SERVICE ENGINEER** describes the construction and operation of the Sparton unit. In Figure 3 of this article you will note a cross section of the seal assembly. The outside of the seal is open to atmospheric pressure through the oil well at "A". The sealing points then are the gasket "K", which seals the seal housing "B" at the compressor casing. The other two sealing points are the seal nose at "I" and its running surface against the seal ring "H". This steel seal ring "H" is sealed against the shoulder of the motor shaft with a soft copper gasket, and the seal ring is forced against the shoulder by the eccentric "L", which is threaded on to the shaft.



CROSS-SECTION OF SEAL ASSEMBLY

- | | |
|----------------------------------|---------------------|
| A—Oil well | G—Fiber thrust ring |
| B—Seal housing | H—Steel seal ring |
| C—Bellows | I—Seal nose |
| D—Eccentric threaded
on shaft | J—Seal spring |
| E—Motor shaft | K—Gasket |
| F—Steel thrust ring | L—Eccentric |

Thus the sealing is complete so that no refrigerant can pass from the compressor crankcase to the atmospheric pressure area on the outer part of the seal.

The oil well "A" is intended as a means of lubricating the thrust washer "F" and the outer parts of the seal nose. This does not require a large amount of oil but a certain reserve is held there all the time.

I think it is very likely you have an imperfect seal between the steel ring and the seal nose itself, so that gas is blowing out at that point; or, it may be that you have omitted the soft copper gasket between the steel ring

and the shaft shoulder. This gasket, the gasket "K", and the sealing surface at the seal nose are the only three points where it may be possible that refrigerant would leak through around the shaft.

NORGE COMPRESSOR STUCK

QUESTION 483: I was called to service a household refrigerator which was a Norge Model J., Class E., charged with SO₂, about a 1933 make. When I arrived I was informed that the motor would run but it would not pull the compressor at rated speed so the motor got very hot.

I placed the gauges on the compressor and opened the valves and I got about 50 lbs. of pressure. I tried to start the motor and found just what I was told—the motor would not pull the load. I then tried to turn the compressor over with the belt off and found that it would take about two hands to turn it over. After some coaxing I got the compressor to run but it overloaded the motor. Then I only got about 75 lbs. on the high side while running. I then connected a 1/4 hp. motor on the compressor and this operated it for about an hour before it got hot, but with all this the compressor did not loosen up any. I did not have any high head pressure at this normal running. I then took the compressor out and found the oil very yellow, and then at the last the oil was black. This came out of the hose when I blew out the gas in the compressor before disconnecting it. The compressor turned over quite freely when out. What do you think could have been the trouble?

This unit was overhauled in Baltimore a few months ago and operated satisfactorily but it was shipped to this place and has been in storage for about two months. All this happened when I attempted to start it up. The evaporator is of the low side float.

ANSWER: Apparently the Norge system that you describe has contained a little moisture which is giving you trouble at the present time, and I think it is quite likely that the system is getting gummy, which causes an overload on the motor. The yellow oil you speak of is probably caused by a rather large amount of SO₂ which is mixed with it.

During the period that the unit has been lying in storage, it is quite likely that a considerable quantity of SO₂ condensed in the compressor and mixed with the oil. When you drain this oil off, the SO₂ and oil combined would appear very yellow, and look as though an emulsification had taken place.

The dark-colored oil was dirty and probably contains considerable sludge.

The moisture in the system would cause the formation of this sludge and would create a gummy condition in the working parts which, in turn, would make the compressor hard to turn over.

One way of correcting this without going to too much work is to inject about two ounces of Xylene in the system, then permit it to run for approximately two weeks, after which time all the oil and refrigerant should be blown out of the system, and the system charged with fresh gas and oil. Xylene is a good solvent for the gummy sludge formed through moisture in an SO₂ system. This sludge, when dissolved, will circulate with the refrigerant and oil, and for this reason, it is advisable to install a filter in the line.

Of course an acid condition may exist due to the moisture and for this reason, I believe it best to blow out all the gas and oil after a period of about two weeks, recharging the system with clean refrigerant and oil.

NORGE, FRIGIDAIRE AND WESTINGHOUSE TROUBLES

QUESTION 484: Several months ago I was called to service a 1938 Model Norge refrigerator which had been inoperative for some time. I found the unit short of SO₂ so I recharged it and then found a leak where the liquid line joins the evaporator highside float, small diameter liquid line serving as restrictor. This was discharged and repaired. It was reassembled, put back in operation, pulled down perfectly and cut out and then cut back in almost instantly. I tested it on several cycles, tested check valve in suction line which I found to be leaking. This I replaced with a new valve. I put it back in operation and experienced the same condition. The liquid line was sweating on off cycle. I replaced a highside float and then had the same condition that it started with. The charge was given plenty of time to balance and it was balancing charge after each of these changes. I am familiar with the peculiarities of a Norge such as the compressor construction and purpose of check valve in suction line, even cut suction line between check valve and evaporator and installed a compound gauge to be sure new check was not leaking. The control was a Cutler-Hammer J-5 non-adjustable. I did manage to get unit to off cycle for several minutes before coming on again. It is a characteristic of this particular model to partially defrost on off cycle but not like this.

As a result, when running the evaporator frosts as it should. On off cycle it completely defrosts about half of evaporator. As a consequence, after several days of operation, there is half an inch of frost half way up evaporator. The other half has frost on on cycle, no frost off. It freezes cubes quickly and the refrigerator temperature is around 40°. I'm at a loss as to what can be the cause of this condition. Later I used a highside float that was taken off a Norge on monitor top General Electric and its operates perfectly.

Frigidaire Commercial

A few days ago I was called to service a 1 hp. Frigidaire water cooled SO₂ highside pulling directly on display case and cooler. By saying directly, I mean that there is no two temperature valve in suction line on case or cooler. I knew this job was leaking. The complaint was operating continuous. I was careless or too confident that unit was short on SO₂. However, conditions afterward bore out that the assumption was correct. Without putting on sight glass I added seven pounds of SO₂ and left gauges on unit. I went back the next afternoon and found machine had not shut off. High side pressure 85-90, suction from 0 pounds to 2" V. I watched compound gauge for 1½ hours. It didn't vary from above and cooler temperature was too high. The top door was opened and there I found a cake of ice extending from drain board through the bottom coil about half way the length of evaporator. This is a completely flooded coil employing headers. This confirms my assumption that unit was short of SO₂ to begin with, as it took a long time to form that much ice which extended as far as the liquid did. I melted the ice with a stream of water, put it back in operation, compound gauge reading was the same with cooler temperature coming down from 43 to 37 degrees. Operation still continued. I cut the cooler liquid and suction off at manifold cycled display case which was O.K. The control was set to cut out at 6 inches. Cut display case off with manifold valves and had to run it about 6 hours to reduce cooler enough to reduce to 6 inches. There being frost on the suction line almost to the compressor I tried to adjust superheat to cut frost from the suction line. (Has 15 foot drier coil on evaporator.) I was unsuccessful so I installed a new Detroit 673 expansion valve, 5/64 orifice. The results were still the same on compound gauge. I realized that I used wrong procedure,

You've got to keep them on the job!

This war is placing a lot of additional responsibilities on the maintenance man's shoulders. It isn't easy to get replacements if refrigeration equipment goes haywire. That's why it is good going to head off trouble by drying refrigerants DRY, by cleaning and freeing them from acid.

Alorco Activated* Alumina helps you assure smooth, uninterrupted operation of refrigeration equipment. It does an effective drying job, removing every trace of moisture to dew points of -110° F. It also removes sludge and acid. Cartridges or dehydrators charged with this efficient drying agent, inserted in the refrigerator lines you service, avoid trouble with frozen valves, reduce wear and prevent corrosion.

Your supply house can take care of your requirements. Be sure to specify "Alorco Activated Alumina" for maximum drying and purifying efficiency. **ALUMINUM COMPANY OF AMERICA** (Sales Agent for ALUMINUM ORE COMPANY) 2159 Gulf Bldg., Pittsburgh, Penna.

These manufacturers supply cartridges and dehydrators charged with Activated Alumina:

American Injector Co. . . Fedders Mfg. Co. . . Henry Valve Co. . . Imperial Brass Mfg. Co. . . Kerotest Mfg. Co. . . McIntire Connector Co. . . Mueller Brass Co. . . Cyrus Shank Company.



* Registered trade mark



being too confident that shortage of gas was the trouble. I pumped the unit down, installed a sight glass and removed the large liquid line strainer which I thought might be partly stopped. I checked the compressor with the suction valve closed. It almost snatched the needle down to 28 inches and held with discharge valve open and liquid pumped down exerting all possible pressure on flapper valves. This pulled the vacuum instantly and held it indefinitely. I'm sure that the flapper valves are not leaking as the suction valves are in pistons. Could it be possible that under load they leak back part of the volume and in that way cause the compressor to be inefficient? It is possible that a blow back by the pistons could cause this but as the unit is not very old, I can't see how it could have worn enough to cause this condition. These observations were made at room temperature—90° head pressure.

Could it be that the unit is overcharged, affecting the displacement of the compressor. I think that I have more than one trouble and symptoms are confusing me.

Westinghouse Domestic

I have rebuilt quite a number of hermetic units, namely Westinghouse coolers for beverage. I would like to know if it is practical to try to substitute a capillary tube for a high side float on the older models charged with SO₂. It is not practical to try to change float when one becomes inoperative as the liquid line is contained in suction and the task would be too great.

Is it possible to secure information on viscosity and amount of oil used in Frigidaire, etc., hermetics, as I am interested in that field and have had to use trial methods in some cases.

ANSWER: It would seem to me that your present trouble is due to the cold control itself. As you stated, these machines are intended to defrost to some extent on the off cycle. However, they should not warm up so that they defrost half of the evaporator, thus building up a heavy coating of ice on the lower part. The fact that the machine cycles so rapidly would seem to indicate that the contacts of the cold control do not make a full break. This may be because the power element has lost part of its charge or may be due to sticky action of the control. Some of these controls were non-adjustable and it is possible that you cannot make any adjustment on the one which you have. However, I would suggest that you try to set it

down another 3—4° until you obtain a low enough temperature that the evaporator does not defrost to such an extent as at present. This will overcome part of your trouble, or at least give some indication of it.

The short-cycling may very likely be due to some other trouble in the control itself and may necessitate replacing it entirely.

With regard to the Frigidaire water-cooled commercial system, your letter is not quite clear as to the type of evaporator used in the walk-in cooler and I am convinced that your trouble is in the coil and not in the compressor. If I understand your description correctly, this Frigidaire coil is one of the type employing both suction and liquid line header. The coil is intended to operate fully flooded even though it is equipped with a thermal expansion valve. A description of the manner in which this coil is supposed to be installed may help us determine definitely whether or not we are both speaking of the same type of coil and will establish the proper method of installation which, I am inclined to believe, may be one of your troubles.

Flooded Coil

These coils are equipped, as I said before, with both liquid line and suction line headers. The liquid header is the smaller of the two and the coil is intended to be installed with the small header or liquid header on the bottom. The expansion valve is connected into this header, but the valve itself is located above the coil or at least high enough to be on a level with the suction header. The suction line is connected to the suction header and this header is baffled in such a manner as to eliminate liquid returning into the suction line until the coil is completely filled with liquid. This type of manifold arrangement makes it extremely difficult to operate the coil in a starved condition, therefore, it is necessary in making adjustments to see that the evaporator surface is being completely flooded with refrigerant as this is the only way proper expansion valve control can be obtained. The back pressure obtained from these evaporators will be very similar to that obtained with the ordinary flooded type evaporator. It is possible that you will find this evaporator is connected improperly which would be the cause of liquid returning down the suction line even while you believe that the system does not have sufficient refrigerant. After you have the coil connected as I have described then it is en-

1930 1933
1936 1940
1942 1947
**EXTRA YEARS
OF SERVICE**
1952
1958

The extra years of service built into Brunner Condensing Units is more important than ever. It means added refrigeration protection for preserving food vitally needed for defense and preventing food spoilage.

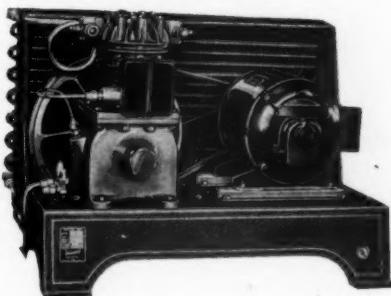
Brunner condensing units are precision built by the finest methods of manufacture to insure dependable service and long life. All working parts are engineered to give maxi-

mum performance regardless of the work they're called on to do. For a quality condensing unit with the ability to serve you well for many years, specify Brunner.

Brunner units are available from $\frac{1}{4}$ to 25 h.p. air and water-cooled models for every type of application. Write for fully illustrated catalogs. Brunner Manufacturing Company, Utica, New York, U. S. A.



BRUNNER MODEL A-100
 ... 1 h. p. air-cooled condensing unit for average heavy-duty commercial applications. It will handle an 8' x 6' x 10' cooler in addition to a 16' display case. Also recommended for beer coolers for pre-cooling barrels of beer.



tirely possible that there is not sufficient refrigerant in the system to keep this coil completely flooded.

Capillary Should Work

With reference to replacing the high side floats with capillary tubes on hermetic units, I am of the opinion that this can be done satisfactorily since most units designed to operate with a high side float will perform equally satisfactorily with capillary tubes. This is because both types of systems employ a flooded evaporator and both operate in a similar manner with the exception that the high side float does tend to stop the flow of refrigerant at a certain part of the cycle and prevents the balancing of pressures during the off cycle.

The capillary tube does not prevent pressures becoming balanced. It some cases this may be an advantage because where the pressures are balanced the starting load may be greatly reduced. Your difficulties will be in determining the length and diameter of capillary tube to use in each individual machine and it would probably be necessary to do some experimenting before you arrive at a satisfactory length.

I am sorry to say that we have never had any information on the amount and kind of oil used in any hermetic unit. The manufacturers have never released this information and naturally there is no other source through which authentic information could be gained. We have such specifications on all the open types of units but not on hermetics.

More Tire News

EACH application for new tires, recaps or retreads, will be passed on by local tire rationing boards considering the merits of each individual case. No blanket eligibility classifications for essential services will be made by the Office of Price Administration. Applicants have the right of appeal from local board rulings within thirty days of final decision.

Reports from various sections of the country indicate that many more local boards are recognizing the vital service performed by refrigeration service men and accordingly are granting certificates for refrigeration service cars.

The following letter from the assistant general counsel of the OPA provides additional information on the subject.

OFFICE OF PRICE ADMINISTRATION

Washington, D. C.
Temporary Building "D"

Refer to: 5:12:RLS
March 26, 1942

Refrigeration Service Engineers Society
433 North Waller Ave., Chicago, Illinois
Gentlemen:

We acknowledge receipt of your letter of March 11, 1942 which has been given our earnest consideration. You suggest that the appeal from decisions of Local Rationing Boards as to the eligibility of your refrigeration servicemen for tires should be handled by an appeal to our Office as a national body instead of by each applicant whose certificate is denied by a Local Board.

We regret that your suggestion cannot be followed. Chapter IX of the revised Tire Rationing Regulations sets forth the procedure for an appeal from the denial of the issuance of a certificate by a Local Board. Under this Chapter, an appeal must

be taken within 30 days from the date of the action of the Board to the State Rationing Administrator and if the appellant feels aggrieved by the ruling of the State Rationing Administrator he may, within 30 days thereafter, file a written petition for review with our Office. Each appeal must be handled separately because each case must be determined on its own merits. Furthermore, each appeal must be handled by the applicant under the terms of the Regulations.

In calling our attention to a refusal of a Local Board to declare one of your members eligible for tires under Section 504 (a) (2) (See Note 1), you suggest that the Local Boards may be thinking of eligibility classifications by groups. We do not believe this is the case as the eligibility of each applicant must necessarily be determined by the service which the use of his car enables him to perform. In this connection, we call your attention to Section 501 (c) (3) (i) (See Note 2) which requires the Local Board, in determining the eligibility of any applicant for retreaded or recapped tires, to be satisfied that the applicant is rendering a service indispensable to the community and to the war effort. In applying this subsection the Local Board may not have been satisfied as to the indispensable nature of the service being rendered by one of your members.

We trust that we have made clear the situation which is presented to the Local Board on these applications.

Yours very truly,
(Signed) Thomas E. Harris
Assistant General Counsel

Note 1—504(a)(2) Transportation of persons to enable them to render construction or mechanical, structural or highway maintenance and repair services.

Note 2—501(c)(3)(i) That such passenger automobile will, when equipped with tires for which application is made, render services sufficiently valuable to the community and the Nation to justify the use of rubber in its operation in view of the critical shortage in the total rubber supply and the size quota from which allotments of tires must be made to all other applicants qualified under this section.

KEEP 'EM FIT
TO
KEEP 'EM FIGHTIN'



REFRIGERATION has played no small part in improving the health and efficiency of our armed forces. Fresh fruits, vegetables and meats are a regular part of the soldier's diet.

The far seeing heads of our armed forces recognize the fact that a casualty from disease is just as much a loss to our army as a man stopped by a machine gun. That is why you will find thousands of CHIEFTAIN refrigerating units installed in camps, air fields and base hospitals, from Alaska to Hawaii, from the Canal Zone to the Philippines as well as in Continental United States. CHIEFTAIN also sails the seven seas with the Navy, preserving the vitamin rich fresh foods and precious drinking water.

But, wars are not won with refrigerators. Tecumseh Products Company is in production on vital munitions. New plants have been built and purchased, new equipment bought and, as rapidly as the need for refrigerators by our Government is reduced, the machine tools released are being converted to additional munitions manufacture.



WE'RE ALL OUT FOR VICTORY
TECUMSEH PRODUCTS CO.
TECUMSEH MICHIGAN

"At long last", you say—

8th Annual RSES Convention to Be Held May 10-12 in Chicago

R.S.E.S., R.E.M.A. and N.R.S.J.A. Combine in All Industry
Convention and Conference Clinic

YES, at long last but it will be worthwhile waiting for. Remember the reason for postponing the convention? It was because a new Repair Order from W.P.B. was expected and because it was advisable to wait until some of the best speakers from Washington could be secured to address our meeting—well, we have both now.

The new Repair Order will be issued and in force in time for the convention, and because of the changes it will create in the conducting of your business, it will be the nucleus of a large part of our discussions. Because it is important to the continued existence of your business that you have a thorough understanding of the implications and operation of this order, you will not want to miss this opportunity of getting an authentic interpretation of it.

To give us an authentic interpretation of this order and to explain other war time economies instituted by our Government, there will be several outstanding speakers from the Office of Price Administration

and the refrigeration branch of the W.P.B.

In addition there will be numerous industry speakers on subjects of vital interest to the conductance of your business today. There will be a stirring patriotic orator of national fame and there will be impressive features which are guaranteed to multiply the red corpuscles of your blood and send you home again with a renewed vigor impossible to down, irrespective of the problems encountered. All men of the industry are invited to attend.

The eighth annual R.S.E.S. convention will be held at the Stevens Hotel, Chicago, in conjunction with the All Industry Convention and Conference Booth Clinic sponsored by the Refrigeration Equipment Manufacturers Association. The National Refrigeration Supply Jobbers Association will participate in this convention as well as other associations in related fields.

The All Industry Meetings in which the entire audience will participate includes two morning educational sessions. These meet-

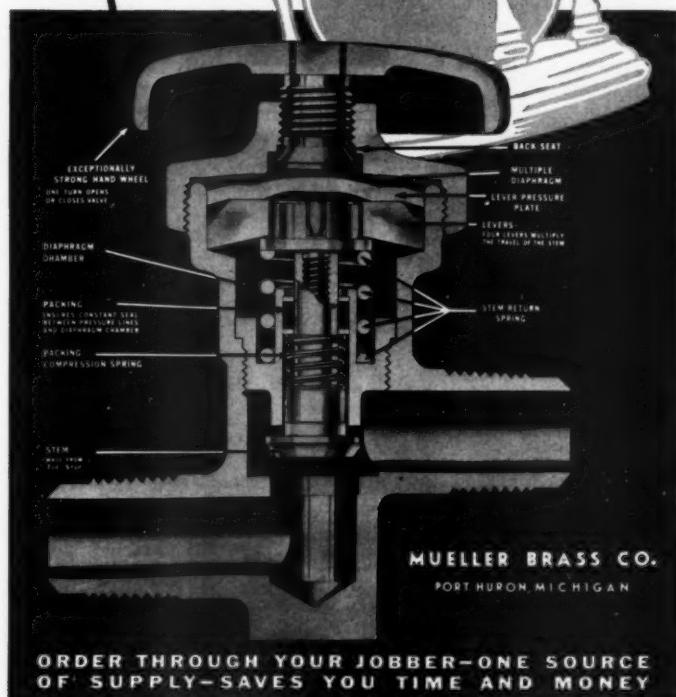


Increased DIAPHRAGM LIFE PROLONGS THE SERVICE LIFE OF THE VALVE

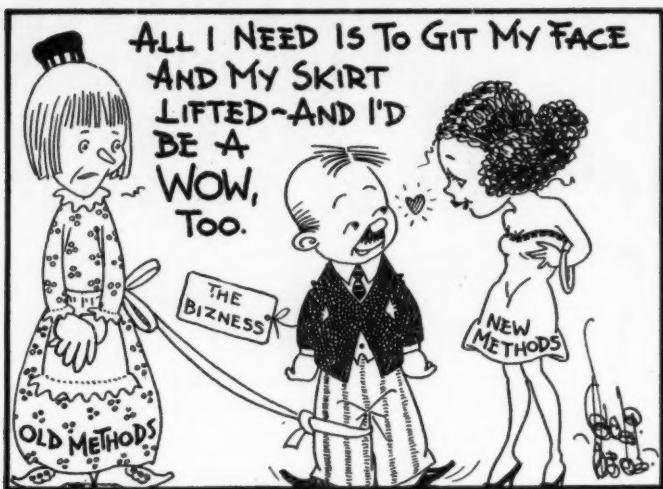
Because of the small amount of movement, the multiple diaphragm in our Triple Seal Valve is never deflected past its normal center, thus immeasurably prolonging both its life and the life of the valve in service.

This valve has positive sealing at three essential points—back seat with valve in open position—the multiple diaphragms—and the superior packing around the stem. This packing assures constant seal between pressure lines and diaphragm chambers.

One turn only completely opens or closes the valve.



ORDER THROUGH YOUR JOBBER—ONE SOURCE
OF SUPPLY—SAVES YOU TIME AND MONEY



ings will feature such topics as "What It Means To Be In Total War"; "What The Refrigeration Industry Means To A War Program"; "The Wholesalers Function In The War Effort"; "Functions Of The W.P.B.;" "Substitutes And Priorities"; and "What This War Requires Of Our Industry."

To replace the customary exhibition of manufacturers' products, there will be a standard type of conference booth for each participating manufacturer and wholesaler where no products will be displayed but where you may contact the various manufacturers and secure the literature and information you require. These booths will be open the two days of May 11 and 12.

Priorities Clinic

Another feature of the meeting will be a Priorities Clinic for all manufacturers, jobbers and service engineers, open for the entire afternoon of Tuesday, May 12. If you are interested in learning how to properly fill out priority forms, you may do so by visiting this Clinic where men from the industry will be on hand to assist you.

R.S.E.S. Meeting to Start on Sunday

In order to permit the service engineers' attendance at this meeting with the least number of lost working days, the R.S.E.S. will hold their convention Sunday, Monday and Tuesday, May 10, 11 and 12. The Sun-

day morning session will include reports on activities of the Society, appointment of convention committees and future activities. The afternoon session will be devoted to an educational program.

Monday morning our members will attend the All Industry meeting and in the afternoon there will be a combined business and educational meeting.

Tuesday morning we will participate in the All Industry meeting and Tuesday afternoon will be left open for visits to the Conference Clinic or the Priorities Clinic.

Meeting Offers an Opportunity

This will be an opportunity for both service engineers and jobbers which will not be repeated for at least another year and may not be repeated for the duration. There have been many instances in recent months where several days of valuable time have been lost and many miles travelled, in contacting one or two manufacturers. This convention and conference clinic will offer you the opportunity of visiting many manufacturers in one place and within a short space of time.

The Ladies Will Be There

The R.S.E.S. Auxiliary meetings will be timed to coincide with the men's meetings and the ladies will arrange their own educational and entertainment programs. No

"The Chart is a necessary part of my equipment"

so says this service man

Now that the Calculator is being put to the test of practical use in the field, we have had a number of letters from service men testifying to its value. This one is typical.

WRIGHT'S H. B. P. CALCULATOR

The purpose of the Head-Back Pressure Calculator is to quickly determine the proper head pressure, for the following refrigerants when the suction pressure, room temperature or mean water temperature is known.

Carrene	Methyl
Isobutane	Freon or F-12
Sulphur Dioxide	Ammonia
Carbon Dioxide	



Sometime ago I purchased a Head-Back Pressure Calculator from you, but misplaced it. The chart is a necessary part of my equipment, so please send me another.

J. V. Farmer

A Vestpocket Tool Every Service Man Should Carry

A number of troubles can be detected by comparison of the existing head pressure and what the head pressure should be, but in the past there has been no convenient method available to the service engineer to determine what the correct head pressure should be. Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all determine the proper head pressure. It is not practical to depend on one's memory of other similar conditions or to just use snap judgment when this handy calculator gives you the correct answer so easily. Send for it today! Sturdily constructed, with oil-proof finish, for on-the-job use.

POSTPAID \$1.00

NICKERSON & COLLINS CO.
435 N. WALLER AVE., CHICAGO

definite program has been announced by them as yet but an invitation has been issued to all ladies of the industry to participate in the entertainment features to be scheduled.

The Annual Banquet

The All Industry Annual Banquet will be held at 7:30 P.M. Tuesday, May 12, in the Grand Ball Room of the Stevens. The main feature of this banquet apart from the eats and usual dancing, will be an address by Dr.

Preston Bradley on "Democracy." Dr. Bradley is a nationally known philosopher and radio commentator who will leave you with much food for thought in these troubled times.

Here is the combined three-day program of the R.S.E.S. convention and All Industry Convention and Conference Clinic. Note the impressive list of speakers and their subjects —then make your plans now to attend. The necessary time and money could not be spent in a more profitable way.

ALL INDUSTRY AND CONFERENCE CLINIC THREE DAY PROGRAM

Sunday Morning, May 10
MEETING OF SERVICE ENGINEERS—10:00 A.M.
Convention called to order by James J. Kline, President, Illinois State Association, R.S.E.S.

A message from the President of R.E.M.A.
E. A. Vallee, President.

Introduction of National Officers.

Address by President E. A. Plesskott

Secretary's Report—H. T. McDermott

Treasurer's Report—S. A. Leitner

Report of Committees

Advertising Committee—Willis Stafford

Suggested Price Book Committee — Edward A. Vadakin

Educational Committee—A. M. Fenwick

Other Committees

Appointment of Convention Committees

Auditing Committee

Resolutions Committee

Nominating Committee

Announcements

Adjournment

Sunday Afternoon, May 10
MEETING OF SERVICE ENGINEERS—2:00 P.M.
Information Please

Brazing as an Aid to Servicing Refrigerators—By R. E. Chapin

Plastic Materials—Tenite and Saran tubing.

The application of cold plates saves copper—By A. F. Sawyer

Monday Morning, May 11
JOINT SESSION OF MANUFACTURERS, WHOLE-SALERS, AND SERVICE ENGINEERS—9:30 A.M.

Meeting Call to Order

Singing of "Star Spangled Banner" and "God Save the King"

Address—"What It Means to Be in a TOTAL War"—Robert Horton, Public Relations Director, Office of Executive Management, Washington, D. C.

Address—"The Conservation Code of the Air Conditioning and Refrigeration Industry"—Dr. W. R. Hainsworth, President—A.S.R.E.

Address—"What the Refrigeration Industry Means to the War Program"—George Taubeneck, *Air Conditioning & Refrigeration News*

Paper—"The Refrigeration Service Engineers' Part in the War Program"

Paper—"The Refrigeration Wholesalers' Function in the War Effort"

AFTERNOON CONFERENCE CLINICS—in Exhibition Hall—1:30 P.M. to 9:30 P.M.

Monday Afternoon, May 11
MEETING OF SERVICE ENGINEERS—2:00 P.M.

Information Please

Reports of Convention Committees

Auditing Committee

Resolutions Committee

Nominating Committee

Election of Officers

Unfinished Business

New Business

Adjournment

Secretary's Dinner Meeting—6:00 P.M.

Tuesday Morning, May 12
JOINT SESSION OF MANUFACTURERS, WHOLE-SALERS, AND SERVICE ENGINEERS—9:30 A.M.

Meeting Call to Order

Singing of "Star Spangled Banner" and "God Save the King"

Address—"The Functions of the Air Conditioning and Commercial Refrigeration Branch of the War Production Board"—J. M. Fernald, Chief, Air Conditioning and Commercial Refrigeration Branch, W.P.B.

Talk—"Substitutes and Their Place in the War Program"—H. A. Anderson, Bureau of Industry Conservation

Topic—"Substitute Material and Practices in Our Industry"

a. Tubing—George Franck, Imperial Brass Manufacturing Co.

b. Valves and Fittings—Mueller Brass Co.

Address—"What This War Is Requiring of the Refrigeration Industry"—A. B. Schellenburg, Alco Valve Co.

Question Box Period—(During this period those in attendance are invited to direct questions to any of the speakers)

PRIORITIES CLINICS for Manufacturers, Wholesalers and Service Engineers in Booths—2:30 P.M.

CONFERENCE CLINICS IN EXHIBITION HALL—1:30 P.M. to 5:30 P.M.

ALL INDUSTRY BANQUET—Tuesday, May 12, 7:30 P.M.

1. Singing of the National Anthem

2. Orchestra and Singing during serving of banquet dinner

3. Address—"Democracy"—By Preston Bradley, Chicago, Illinois

4. Adjournment

KEEP THAT CYLINDER ON THE JOB!

*...How you can
help avoid a shortage
of "Freon-12"*



THE Interstate Commerce Commission has provided for many years that refrigerant gases must be shipped in pressure cylinders complying with certain specifications. These cylinders are manufactured by only three companies, whose output is limited. Beyond that, there is a shortage of steel for the war program. There is no shortage of "Freon-12" at this time, and there is a good chance that there will be no further shortage of the refrigerant itself, owing to the stepping up in capacity of Kinetic's plant and the satisfactory raw material situation.

But there is a serious shortage of steel pressure cylinders which can only be relieved by your returning the empty cylinders you and your customers have on hand.

1. Jobbers and retailers should call up every customer and keep after him until he returns the empties.

2. Servicemen should advise owners of air conditioning machines that now is the time to service these machines and make up any refrigerant losses. This can be done right now because WPB has released during March all the "Freon-12" immediately necessary for servicing equipment.

Return the empty cylinders. You get money for them, and this helps finance more work.

By returning them now, you are helping to prevent a shortage of "Freon-12."

Kinetic has never obligated itself to take back empty cylinders that are out of its plant over 90 days, except those shipped abroad. Kinetic will take these cylinders back now, but reserves the right to refuse them if you hold them too long.

Won't you for your own self-interest, the interest of your neighbors, and for patriotic reasons, return empties needed in the war program? If you will use extra effort in hunting up empties, you will have contributed much toward the war effort. Make a serious and concentrated drive now to return "Freon-12" cylinders.

* * * "Freon" is Kinetic's registered trade-mark for its fluorine refrigerants.



FREON

REG. U. S. PAT. OFF.

safe refrigerants

KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE



Ontario Maple Leaf Chapter Holds Successful Canadian Refrigeration Conference

THIS year's Canadian Refrigeration Conference held in Toronto on March 15 and 16 at the King Edward Hotel had truly an international complexion because of the number of visitors attending from the United States. The program included representatives of manufacturers from the States, all of whom touched on the critical situation confronting all industry due to the scarcity of material.

This convention exceeded in interest and attention any of the previous meetings which have been held, and in streamlining the meeting to meet war time conditions, a conference type of manufacturers' clinic was held in conjunction with the meeting. No products were on display, but conference booths were assigned to contributing exhibitors.

Sunday, March 15

The meeting was formally called to order by Kenneth Wood, President of the Ontario Maple Leaf Chapter, and amid very impressive surroundings, Mr. Wood conducted dedication ceremonies honoring the memory of those who passed on since the last meeting as well as those now serving in the military forces.

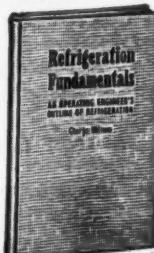
Following the opening ceremony, H. T. McDermott, Secretary of the International Society, sounded the theme of the convention and briefly outlined the conditions confronting the maintenance and service business. He said in his opinion the Government recognizes the essentiality of refrigeration service and will issue an all-coverage commercial and domestic repair order to expedite the securing of parts and supplies and in all probability would require the registration of service contractors in order to exercise control over the proposed order.

The meeting adjourned until the afternoon at which time Harry Parish presided as Program Chairman and introduced E. B. Wilkins, Chairman of the Canadian Advisory Committee, whose subject "Service Under War Time Conditions," specifically treated the problems of the Canadian refrigeration industry and made some definite recommendations for the war time period.

A view of the annual Dinner Dance held during the Canadian convention.

Three books you should have

• Every service man, refrigeration engineer or salesman should have these 3 books in his library. Inexpensive and entirely practical they'll help you to earn more by "learnin'" you more.



REFRIGERATION FUNDAMENTALS

by GEO. HOLMAN

Here's an unusual book that makes the Theory of refrigeration easy to understand. The author is first of all a practical engineer. This book is the text he would have liked to have had when he first started the study of refrigeration, but nothing like it has been available until now. Unlike most authors of books on technical subjects, Holman has an interesting and logical style in expressing his thought. Even if you are already an expert engineer you will enjoy reading his unorthodox explanations, and he will undoubtedly give you a new slant on the subject. If you are just starting the study of the fascinating and complex subject of refrigeration, Holman's unusual book will give you a clearer picture of what you are going to learn.

Price..... \$2.00

• Above prices are all postpaid. Save yourself some money, all 3 above books \$4.50, any two above books \$3.00, when ordered at the same time, remittance must accompany order.

**Nickerson & Collins
Company, Publishers**
435 N. Waller Avenue
CHICAGO • ILLINOIS

COMMERCIAL REFRIGERATION and COMFORT COOLING

by S. C. MONCHER



Here is a book that shows you in an easy-to-understand way How to Calculate Refrigeration Loads. The author through his wide experience in the refrigeration field is thoroughly familiar with the problems encountered in the field by refrigeration service and installation engineers, refrigeration equipment salesmen, architects, and others with a general knowledge of the field who are interested in gaining a more thorough understanding of the commercial refrigeration and comfort cooling industries as they exist today.

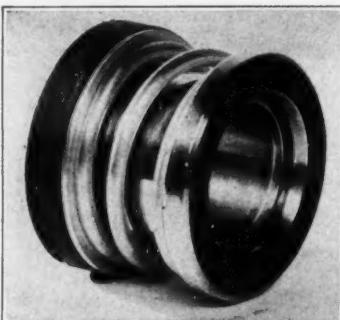
Price..... \$1.50

Broaden your understanding of Refrigeration, by learning more about HEAT . . .

In writing this book it has been the aim of the author, Dr. S. R. Cook, to produce a book on heat and its relation to refrigeration and air conditioning, which would be instructive to anyone interested in this field, and at the same time readily readable. The purpose is to give information essential to solution of problems that may arise in the operation of refrigeration and air conditioning machinery or for the student in his study of the science. A portion of the book is given over to definitions of terms used in heat and refrigeration and air conditioning, and to tables of heat constants which will be found very useful.

Price..... \$2.00





When Other Seals Fail Try
SYNTRON
"ANTI-FRICTION"
SHAFT SEALS
ON NEW—AS WELL AS ON OLD,
WORN AND SCORED SHAFTS.
A Complete Line.
See Your Jobber.
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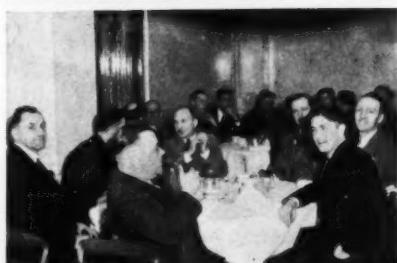
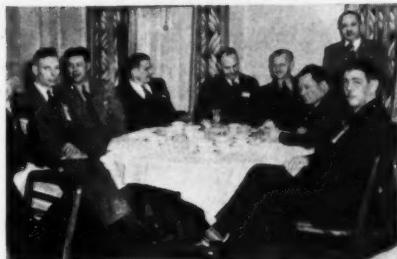
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VIEWS AT THE CANADIAN CONVENTION

The upper picture shows members of the convention committee who are responsible for the high degree of success obtained. The other pictures were taken at a luncheon given for the speakers and exhibitors at the convention.

He emphasized the need to change the routine of the usual business practice in conserving tires, gasoline and materials. He pointed out the necessity of remembering that the good-will of customers must be maintained no matter how much increased service business was handled. He pointed out that after all, good will was the principal asset in any business and that it was just as necessary today for the service man to continue this selling job in anticipation of retaining customers after the war.

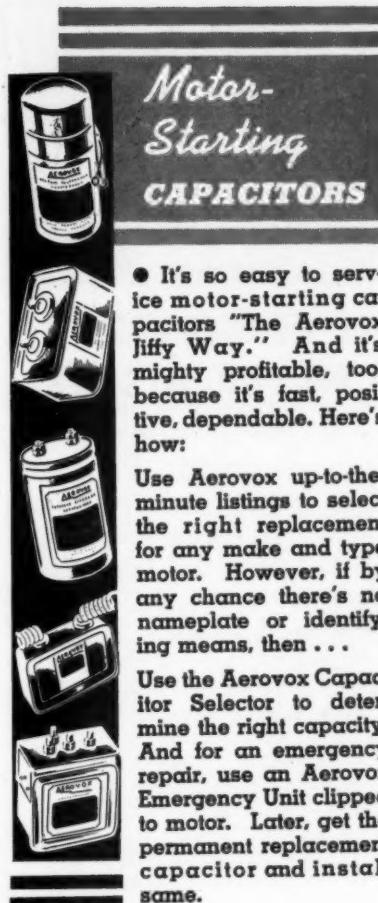
"Copper Goes to War," was an interesting movie shown by E. Beatty of the Anaconda American Brass Company, Limited, New Toronto, Ontario, and it graphically showed direct military manufacture required practically the entire production of copper.

Monday, March 16

The Monday meeting was opened with Harry Parish acting as Educational Program Chairman. William Marshall of the Marshall Refrigeration Service Company, the new President of Ontario Maple Leaf Chapter, presented a timely paper on the re-operation of condensing units and outlined the equipment necessary for the modern shop in handling every servicing and rebuilding operation in today's emergency.

Following Mr. Marshall's address, J. W. Krall, Detroit Lubricator Company, indicated the extent to which the manufacturers of expansion valves and control devices were going to use substitute materials. Parts formerly used could not be secured due to the critical material situation. He also dealt at length on the necessity for using every care and precaution with present valves now installed and indicated that many of the valves returned for servicing only required simple adjustments that could be made in the field. From their experience, continued Mr. Krall, about 50% of the valves returned indicated the only trouble with them was that ice had formed at the seat and the needle and that the valve was perfectly workable.

"Fittings," was the next subject by George Allen, Mueller Brass Company, Port Huron, Michigan, and with his extensive experience in the copper and brass industry, he provided some first hand information as to the present situation on these critical materials. It was his opinion that the copper situation may in a very short time be more critical than aluminum but that it



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METER-MISERS**

★ **S**ERVICE and maintain existing equipment. That's the big job Uncle Sam wants you to do. Depend on *Herveen* for the replacement gas for Meter-Misers.

★ For over three years our jobbers have supplied *Herveen* to service men all over the country. Many of these tell us of business which formerly they had been forced to turn down, which now brings them increased profits, as well as enabling them to offer a more complete service. Leading parts jobbers throughout the country now stock *Herveen*. If yours doesn't, write directly to us.

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was possible the situation might ease somewhat at a later date.

Central Phone Service

G. E. Graff, Ranco, Inc., Columbus, Ohio, made a very interesting talk on what was being done at the present time in converting plants to war work. One of the practical service points he brought out was a practice being adopted by a group of service men in a city who were trying a central phone service and assigning calls to minimize travelling distances. Use of taxicabs were being made on some service calls to conserve tires.

Procuring Materials

A recess for luncheon which included the speakers and members of the various committees and exhibitors was held. In the afternoon Ken Newcum, Superior Valve & Fittings Company, Pittsburgh, Pa., explicitly outlined the regulations covering the securing of materials on the priority system and what the manufacturers of refrigeration equipment in the States were required to do. He pointed out that a priority won't guarantee prompt delivery, particularly in view of the material situation, and briefly outlined a plan that was being considered among manufacturing groups in the industry to pool orders so that a sufficient number could be run to provide an economical production.

Two Movies Shown

Following this address, a very interesting display and movie was shown by A. E. Burn, Canadian General Electric Company, Limited, Toronto, on the use of plastics. Many of the plastics which were displayed were being used in refrigeration work, particularly in the construction of cabinets.

R. H. Israel, Virginia Smelting Company, spoke on the subject of "Refrigerants." He supplemented the showing of the colorful Virginia Smelting picture with facts pertaining to the availability of all refrigerants as of the present date.

At the conclusion of the two-day Educational Program, the "Question and Answer" period, which has become an important part of the Maple Leaf Chapter conventions, was held. The Board of Strategy comprised the speakers of the two-day program.

That evening the Annual Dinner-Dance of the annual convention was held.

R.S.E.S. Chapter Notes

WORCESTER CHAPTER

January 20—President Goodney requested various committee reports among which was the present standing of the treasury. Upon a motion made by one of the members, it was decided that the membership of men called into the armed forces would be continued by the chapter.

February 3—The entire meeting was devoted to business matters of the chapter and to a discussion on service charges.

March 17—Business was dispensed with at this meeting in order to devote more time to the educational program. This program consisted of a talk on brines and their uses by Ben D'Ewart. Following Mr. D'Ewart's talk Sam Soltus provided some information on order P-100 and how to use the A-10 rating on repair parts.

VIRGINIA CHAPTER

February 18—The greater part of the evening was devoted to the annual election of officers, the results of which were as follows: **President**, F. J. Magri; **Vice-president**, R. L. King; **Secretary**, R. W. Lampie; **Treasurer**, Elmer D. Weeks; **Sergeant-at-Arms**, Solomon Linfield; **Board of Directors**, A. V. Carey, H. J. Duke, W. E. Booth; **Educational Committee**, H. J. Duke, W. E. Booth; **Examining Board**, R. L. King, H. J. Duke, R. W. Lampie; **Publicity Committee**, R. W. Lampie; **Membership Committee**, R. W. Lampie, J. B. Trogdon, H. J. Duke. Following the election, the meeting was turned over to the new president, F. J. Magri. A motion was made and accepted that the secretary for the coming year be exempt from chapter assessments.

March 4—In order to stimulate the buying of defense stamps among the membership a motion was made and passed to the effect that the member buying the most defense stamps during the period ending June 4, 1942, would be awarded \$5.00 in defense stamps by the chapter. These stamps to be purchased by the secretary.

March 18—The greater part of the meeting was spent in business matters of the chapter, then the meeting was turned over to the Entertainment Committee and refreshments were served.

ROCKFORD CHAPTER

March 3—Considerable time was spent in a discussion on how to get members to attend the meetings and it was agreed that each member should be allowed to be absent a total of three meetings a year and if any further meetings are missed, he should be contacted. The problem of securing tires or recaps came in for thorough discussion and the secretary was asked to secure further information for the next meeting.



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Insulated Tank Coolers, such as Model CE-25 shown below, are available for prompt shipment on non-defense projects.



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March 16—The attendance prize was drawn by Laverne Johnson in the amount of \$1.25. The balance of the meeting was spent in business matters.

MISSOURI VALLEY CHAPTER

February 5—The annual election of officers took place at this meeting and those elected were as follows: *President*, Elton Lewis; *Secretary*, Ralph C. Walbridge; *Treasurer*, Frank B. Ferguson. After the election it was voted to hold a social meeting on the third Thursday of each month. The chapter drew up a resolution offering its services to the local Civilian Defense Board.

March 5—On the educational program, Mr. Ruegg gave an interesting talk on the priorities problem and possible conditions to be met in the future. The talk produced many questions and much discussion on ways and means of meeting these conditions.

CHICAGO CHAPTER

January 6—This was the annual meeting of the chapter and the election of officers followed the usual routine. The Nominating Committee presented their choice for the year and further nominations were received from the floor. The results of the election were as follows: *President*, Myer Axelrod; *1st Vice-president*, Harold Getty; *2nd Vice-*

president, Wallace Oliver; *Secretary*, Albert Des Rosiers; *Treasurer*, Harry D. Busby; *Sergeant-at-Arms*, Paul LaMarca; *Board of Directors*, Peter Bendl, Otto Hladilek, Herman Goldberg, F. E. Jernberg, Ivar Skipple. A complete resume of WPB orders as they affect the service field came in for a good deal of discussion.

January 30—At this meeting a resolution was passed which read as follows: "Whereas all members are eligible to attend all our meetings and Whereas all men in the refrigeration industry are invited to become members of the chapter, all guests shall in the future attend the meetings only by guest card." During a discussion of future educational programs, the opinion was expressed that the repair procedure of various parts, such as expansion valves, controls, etc., should be emphasized in view of the imminent shortages of these parts.

KANSAS CITY CHAPTER

February 24—The meeting was held in the home of E. L. Tramposh. Mr. Cox, Chairman of the Entertainment Committee, reported on the progress of plans for the annual banquet. A fast sale of tickets was reported and an enjoyable entertainment program being shaped up.

March 10—The entire evening was spent on an inspection tour to the engine rooms



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KANSAS CITY CHAPTER ANNUAL BANQUET

The Kansas City Chapter held their seventh annual dinner-dance March 5th, 1942, at the Plaza Bowl Club Lounge, 430 Alameda Road. Between 65 and 70 members and friends attended and all enjoyed a chicken dinner.

F. C. Smith, President of the Chapter introduced the Master of Ceremonies, "Bud" Easley, who gave a speech of welcome to all present. The officers were introduced by Mr. Easley also the Auxiliary members; each man was asked to introduce himself and companion.

A "Take it or Leave It" contest was conducted with one guest from each table participating. Several were lucky enough to answer the 64c question. Nine hundred pennies were donated by three firms for this purpose. A short session of "Truth or Consequences" followed.

An entertaining sketch of a Mr. and Mrs. Crabtree, having refrigerator troubles, and more troubles with a service man, was enacted by C. L. Hataway as Mrs. Crabtree; A. M. Hoover as Mr. Crabtree and R. F. Cox as the Serviceman.

Door prizes, which had been donated were drawn, then the floor was cleared for dancing. Every one reports a very enjoyable evening.

QUIZ PROGRAM?

QUESTION: Name more than one drier, dehydrator or moisture destroyer that "goes after" trapped moisture and "gets" it wherever it is in a refrigeration system.

ANSWER: There is *only one* — it's THAWZONE! And, by the way, using THAWZONE saves copper which is so much needed by the U. S. war program.



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The PIONEER FLUID DEHYDRANT

of the Muehlebach and President Hotels. This was a very interesting tour and proved to be quite educational.

TWIN CITIES CHAPTER

March 10—After reading of previous minutes, correspondence, etc., President Palen opened a general discussion on the P-100 order and other regulations relating to the refrigeration service industry. He urged that all members secure priority ratings wherever it was possible to do so in order to help the jobber and manufacturer maintain their stocks. Quite a number of questions were put to Mr. Palen from the floor relating to interpretations of the order. Many of these questions were unanswerable at the time, but an effort is being made to secure the proper interpretation. Mr. Ingersoll won the door prize in the amount of \$1.80.

ONTARIO MAPLE LEAF CHAPTER

March 13—A letter was read to the chapter regarding the acceptance of Harry Parish as a member of the Advisory Committee, which also invited him to attend the next meeting of the committee. The annual election of officers took place during the evening with the following results: *President*, Wm. Marshall; *1st Vice-president*, T. W. Savill; *2nd Vice-president*, Frank C. Strong; *Sec-*

retary, Charles A. Kirkwood; *Assistant Secretary*, R. G. Henderson; *Treasurer*, Geo. W. Tindall; *Sergeant-at-Arms*, R. O'Connell; *Educational Chairman*, W. Smallwood; *Board of Directors*, H. Donnell, G. Condie, J. Spence, J. W. McKee, Wm. Brooks, C. W. Moore, Wm. Sneath.

After the election it was brought out that the usual procedure is to elect the retiring president Chairman of the Board of Directors, but it was felt appropriate at this time to change the procedure so that due honor could be paid to this year's retiring president, therefore the office of Honorary President was created and Retiring President Ken Wood elected to it. Mr. Wood expressed his appreciation of the high honor bestowed upon him. The door prize was won by C. W. Moore.

CLEVELAND CHAPTER

March 12—Warren Farr made the suggestion that the chapter revise its mailing list and suggested that they secure the cooperation of local jobbers in an effort to compile an up-to-date list of men engaged in servicing work which could be used by the chapter in future mailings. J. H. Downs, Chairman of the Educational Committee, gave an interesting talk on priorities and also announced the extension of the A-10 rating to cover retail outlets.

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DAYTON CHAPTER

March 12—The educational feature of the evening was a talk by D. R. Goll, formerly a service man for the Crosley Distributing Corp., but who is now employed by the South Park Appliance Shop. His talk centered around the problems encountered in the Crosley Refrigerator.

Members of the chapter are regretting the loss of one of their associate members, Mr. C. A. Miedel. Mr. Miedel passed away March 7. He was in charge of the Industrial Division of the W. H. Kiefaber Co.

LOS ANGELES CHAPTER

January 21—Short talks were given by Carl Lindberg and Frank Gillett on the material situation bringing the chapter up to date on latest priority orders. Officers for the coming year were elected as follows: *President*, W. C. Irving; *1st Vice-president*, C. O. McClellan; *2nd Vice-president*, John Lewis; *Secretary*, D. W. Irving; *Treasurer*, Graham R. McLay; *Sergeant-at-Arms*, W. B. Decker; *Board of Directors*, W. W. Allison, Paul Kieffer, J. C. Rodgers, Frank Gillett, P. H. Askew; *Educational Committee*, J. C. Blair, E. Nelson. Immediately after the election, the installation of officers was conducted by W. W. Allison.

February 25—The meeting was held at the

Terminal Club in Los Angeles. Mr. Askew proposed a joint dinner dance to be held April 11, with the N.A.P.R.E. The proposal was accepted and plans were immediately started. Mr. Fatzinger was the winner of the first drawing of defense stamps. The balance of the meeting was devoted to a discussion of priority orders and substitutes which have been suggested in place of items no longer available.

DES MOINES CHAPTER

February—The annual election of officers took place at this meeting with the following results: *President*, L. C. Bennett; *Vice-president*, H. R. Brewster; *Secretary*, Melvin Haas; *Treasurer*, Gene Funderburk; *Sergeant-at-Arms*, C. R. Jones. The annual party was held at the Pastime Club on February 20th. Eighteen men and their ladies enjoyed a chicken dinner and the entertainment following.

MILE HIGH CHAPTER

March 9—The educational program consisted primarily of a discussion on priority orders. A discussion which followed on the problem of securing a uniform sign to be fastened to members' service trucks led to the adoption of one which was presented to the meeting. These signs, it was agreed,

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should be provided at cost to the members, however, it was felt necessary to determine first whether such a sign was acceptable to the city officials and whether the Society emblem could be used in this manner. Samples of the advertising material furnished by the National Office were exhibited and the meeting was adjourned at 10 P.M., after which refreshments were served.

INDIANAPOLIS CHAPTER

Officers recently elected to serve the coming year of the chapter were as follows: *President*, Leon Teetor; *Vice-president*, J. A. Salter; *Secretary*, Harold Klepfer; *Treasurer*, Robert Ludlow; *Sergeant-at-Arms*, Luther Hartzog; *Board of Directors*, E. W. Wulf, A. Brandlein, N. Mohr, J. A. Salter, E. W. Thomas; *Educational Committee*, J. A. Cassady, Sam Horine, Russel Duncan.

SPRINGFIELD CHAPTER

February 11—The Auditing Committee, reporting on its audit of the Treasury, stated that the books were in perfect order and the report was accepted by the chapter. J. J. Kline made the suggestion that no future bill be paid without a statement being first submitted. Mr. Kresse suggested that the door prize could not be won unless

the name drawn was that of a member present.

February 28—The meeting was held in the home of John Pokora. A pot-luck supper was enjoyed by those in attendance before the meeting opened. The meeting itself was devoted almost entirely to business matters and to a discussion of the latest priority orders.

TRI-STATE CHAPTER

February 24—The meeting was held in the home of Mr. and Mrs. C. A. Brunton. The annual convention, recent priority orders and the use of Freon in air conditioning, were subjects which came in for a good deal of discussion. Several business matters were settled during the evening and a delicious luncheon was served by Mrs. Brunton to the chapter members and the ladies auxiliary.

MOUNT ROYAL CHAPTER

February 9—Messrs. Boucher and Dancey were asked to report on the meeting at Toronto. A complete resume of the meeting and its features was given by these gentlemen. Mr. Milne led a lengthy discussion on the difficulties of obtaining replacement parts for refrigerators. He also told of a recent buying trip to the U. S. A. where he found conditions very similar.

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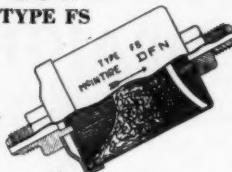
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TRENTON CHAPTER

March 9—The annual election of officers resulted in the following: *President*, Franklyn Beemish; *1st Vice-president*, Louis Gershenfeld; *2nd Vice-president*, George Rook; *Secretary*, Raymond Pental; *Treasurer*, Frank Sujansky; *Sergeant-at-Arms*, Louis Louria; *Corresponding Secretary*, S. C. Segal; *Educational Committee*, Louis Gershenfeld, S. C. Segal. A resolution was drawn up offering the services of the chapter to the local Civilian Defense Council in Trenton. Plans for the 3rd annual banquet were discussed and the date set for April 13.

COLUMBUS CHAPTER

February 19—New officers were elected for the year as follows: *President*, Carl E. Toothaker; *1st Vice-president*, Bert Sayre; *2nd Vice-president*, M. H. Tyssinger; *Secretary-Treasurer*, Paul A. Oberly; *Sergeant-at-Arms*, Irwin Grace.

March 19—The newly elected officers took over at this meeting and final reports were received from outgoing committees. New committees appointed by the president included, *Board of Directors*, C. W. Chaney, R. J. Creamer, N. K. Mason; *Entertainment Committee*, Howard Grossman; *Program and Educational Committee*, J. D. Merkle, H. L. Scott; *Membership Committee*, E. Merrill Brethauer. On the educational pro-

gram a quiz contest was conducted by J. D. Merkle. It was suggested that the price of admission to the next meeting would be the submission of a question on refrigeration by each member. The examination for certificate membership was announced as a future feature.

NIAGARA FRONTIER AUXILIARY

The January 27th meeting was held in the home of Mrs. Bernstone and the auxiliary organized a knitting club designed to help the Red Cross. It was decided to forego the playing of games until the planned project was completed, consequently the meeting of February 10th held in the home of Mrs. L. McCormick and the meeting of February 24th in the home of Mrs. Stanley Szyszkowski were devoted primarily to this knitting project. Luncheons were served at each of these meetings and some business conducted.

The meeting of March 10th, was held in the home of Mrs. Goeckel, the usual knitting session took place and Mrs. Muller served a salad supper. A black-out game, in which prizes were offered, provided entertainment.

March 24—The meeting was held in the home of Mrs. Ralph Davis and later on the ladies were invited to the men's meeting where films of the 1941 national convention were shown.

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WILKES-BARRE CHAPTER FOURTH ANNUAL BANQUET

Members of Wilkes-Barre Chapter, with their women folk, are shown at their fourth and annual banquet in Hotel Redington on February 28.

Following an informal program at which Joseph Read presided as master of ceremonies there were cards and dancing. The women received corsages as favors at the dinner.

Present at the dinner-party: Miss Louise Donatone, Ralph Johnson, Mr. and Mrs. E. Ellsworth Swank, Mr. and Mrs. George Yatsko, Mr. and Mrs. Frank Schultz, Mr. and Mrs. John Selena, J. Donald Munson, Miss Marion Zboray, Mr. and Mrs. Walter Kitzman, Mr. and Mrs. Louis Harris, Mr. and Mrs. Thomas Hughes, Mr. and Mrs. Ben Gerstein, Jr., Mr. and Mrs. Joseph Read II, Mr. and Mrs. Jack Cusick, Mr. and Mrs. Richard Keller, Mr. and Mrs. Allan Reese and Mr. and Mrs. William Thompson, Jr.

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2424 Irving Park Blvd., CHICAGO

FEDDERS EXECUTIVE CHANGES

COMPLETION of a new executive setup for the Fedders Manufacturing Co. Inc. of Buffalo was announced by Theodore C. Fedders, president and treasurer. Warren S. Detenbeck, who had been secretary, has been elected executive vice president and secretary. William C. Winkler has been named comptroller and Paul C. Fedders assistant treasurer. Edmund R. Walker, who has been assistant general manager, has been appointed general manager. Christ W. Fedders and C. H. Batchelor have been re-elected vice presidents.

**H. E. ZERBE NOW WITH LIFSEY
DISTRIBUTING COMPANY**

HOWARD E. ZERBE left the employ of F. H. Langsenkamp Company March 28th to become manager of the Refrigeration Department of the Lifsey Distributing Company, Flint, Michigan.

Mr. Zerbe had been associated with the Langsenkamp Company for the past five years and took an active part in Society activities in the Michiana Chapter. The best wishes of the chapter are extended to Mr. Zerbe, for his success in his new location.

**FLOYD DUVALL NO LONGER WITH
MILLS**

THE many friends of Floyd Duval, Refrigeration Engineer, formerly with Mills Novelty Company, Commercial Refrigeration Division, may be wondering why they have not heard of him recently; and to alleviate these worried brows, here is the low-down.

Recent conversion of the Mills plant to war production and the consequent shift in personnel has made it necessary for Floyd

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to disassociate himself with his former commercial refrigeration work and no doubt enter into war production.

\$ \$ \$
**NEW CATALOGS
AND BULLETINS**

GENERAL CONTROLS Co. have issued a new 48-page catalog of their complete line of regulators, control systems, and solenoid valves. Several new products are introduced for the first time, including small commercial size motor operated valves, new 3-way magnetic lever valves, sensitive D. C. relays, and the new type PV Series electric magnetic valves for airplanes, machine tools, trucks, tractors, buses, and hydraulic systems.

Profusely illustrated with photographs, reproduced blueprints, and cross sectional drawings, this new catalog contains complete tabulated specifications and list prices on all items. It is a comprehensive reference for all engineers interested in pressure, temperature and flow controls for gas, air, oil, steam, etc.

Copies may be obtained without expense by requesting Catalog No. 51 from General Controls Co., 801 Allen Avenue, Glendale, California.

THE HARRY ALTER COMPANY, Chicago, Illinois, have issued a special circular urging all users of refrigerants to return empty cylinders immediately.

Entitled "Wanted for Vagrancy!"—Mr. M. T. Cylinder," the circular makes a strong appeal to refrigeration firms. It points out the necessity of cooperation in order to prevent shipping difficulties this Summer. There is no shortage of refrigerants now, but unless cylinders are promptly returned, local stocks will be greatly curtailed and deliveries slowed up.

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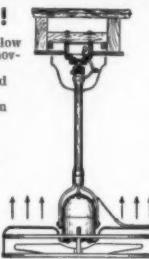
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